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MCI eyes role in outsource net venture

By Barton Crockett
Senior Editor

WASHINGTON, D.C. — MCI Communications Corp. is negotiating with Deutsche Bundespost (DBP) Telekom and France Telecom to form a joint venture to provide global net outsourcing services to multinational companies.

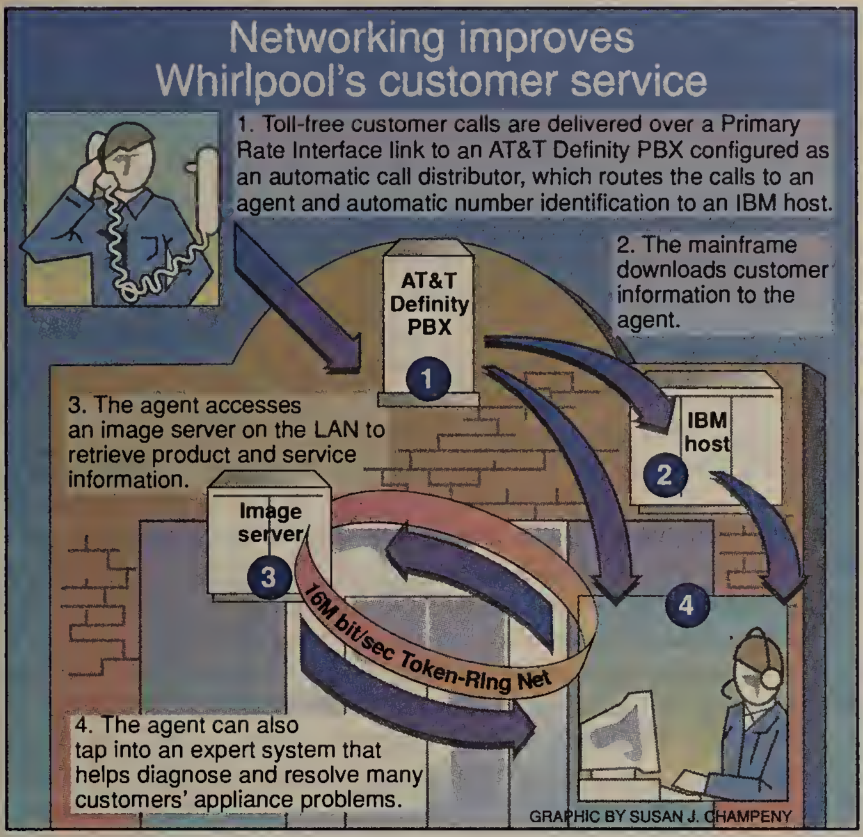
A senior official with one of the carriers involved in the talks said the carriers are discussing plans to build a broadband network that would reach into most major industrialized countries. The companies would use the net to provide end-to-end global private networks.

If launched, the venture would be the carriers' boldest move yet into the global net outsourcing business.

Currently, all three offer one-stop shopping through which each acquires services from foreign carriers on a user's behalf. But none of the carriers manage international user networks or provision private lines outside their home country.

"We already have bilateral arrangements for one-stop shopping and one-stop billing," said a DBP Telekom spokesman in Bonn, Germany.

(continued on page 8)


Networking improves Whirlpool's customer service

1. Toll-free customer calls are delivered over a Primary Rate Interface link to an AT&T Definity PBX configured as an automatic call distributor, which routes the calls to an agent and automatic number identification to an IBM host.

2. The mainframe downloads customer information to the agent.

3. The agent accesses an image server on the LAN to retrieve product and service information.

4. The agent can also tap into an expert system that helps diagnose and resolve many customers' appliance problems.

GRAPHIC BY SUSAN J. CHAMPENY

Appliance maker taking service to the cutting edge

By Bob Wallace
Senior Editor

KNOXVILLE, Tenn. — Whirlpool Corp. last week opened a new customer service center here that will employ an array of technologies, such as ISDN and LAN-based image and expert systems, to improve customer service.

The center is one of two that Whirlpool established after consolidating 26 district offices. Together, the Knoxville and Benton Harbor, Mich., centers will handle a projected nine million calls annually by 1995.

At the centers, customer service representatives using personal computers on local-area networks will field calls along with customer data downloaded from a mainframe. They will be able to access LAN-based imaging systems with stored product information and an expert system that will help diagnose and resolve many appliance problems over the phone.

All told, the overhaul of the

(continued on page 57)

IBM plays catch-up with new LAN Server

New version adds more power, fault tolerance but doesn't meet latest Microsoft release, analysts say.

By Caryn Gillooly
Senior Editor

LAS VEGAS — IBM last week unwrapped a new version of its OS/2 LAN Server network operating system designed to provide better support for mission-critical LAN applications.

LAN Server Version 2.0, announced at Comdex/Fall along with a new release of IBM's OS/2 operating system, promises significant performance improvements as well as new fault tolerance features. The new release also gives users more freedom in choosing local-area network hardware.

But analysts said that despite the enhancements, IBM is falling behind former partner Microsoft Corp., which recently unveiled a new version of its LAN Manager with features not found in LAN Server 2.0.

"IBM is very far behind [Microsoft]," said Charles Robbins, director of communications research at Aberdeen Group, Inc., a Boston-based consultancy. "At NetWorld in Dallas, Microsoft was showing much more advanced products. I'm surprised [IBM] can be that far behind."

OS/2 LAN Server 2.0 includes functionality geared toward larger, corporate users, as well as new packaging options. The product is now available in two

(continued on page 58)

Price comparison of frame relay services:

- ☐ **CompuServe, Inc.**
- ☐ **WilTel**
- ☐ **Sprint Data Group**
- ☐ **BT North America, Inc.**

See chart, page 56.

Frame relay price battle shaping up

By Paul Desmond
Senior Editor

ATLANTA — Pricing details for Sprint Data Group's frame relay service obtained by *Network World* show the company is positioned to compete against CompuServe, Inc. as a price leader in the nascent market.

Although the myriad of options makes it difficult to do head-to-head price comparisons of frame relay services, it appears Sprint Data Group and CompuServe will offer less expensive services than those from WilTel and BT North America, Inc.

However, analysts said all of the services will offer significant cost savings compared with leased lines. They also predicted that the frame relay pricing picture will change over the coming months as carriers respond to one another's announcements and as more players enter the market.

Sprint Data Group will officially announce pricing for its frame relay service, which is scheduled

(continued on page 56)

NETLINE

NASA LAUNCHES plans to implement T-3, frame relay in its backbone net. Page 4.

HP UNVEILS DBMS that blends object-oriented and relational technologies. Page 4.

FTS 2000 USERS testify during Senate hearings about high prices, service woes. Page 4.

IBM, PICTURETEL team to integrate videoconferencing and PS/2s. Page 4.

UNISYS SIGNS with US West Communications for self-healing fiber net. Page 6.

AT&T SHOWS USERS the new Definity PBX. Page 6.

SWISS RELAX telecom policies, take on role as European hub. Page 39.

NEWSPAPER

FEATURE

Untangling the options for a long-term wiring plan

By Salvatore Salamone
Features Writer

If you make a wrong turn while driving, you can always go back and find the right road. Make the wrong choice in selecting a cabling system and you're stuck with it for years.

Rewiring a building isn't something network managers want to do frequently. Nor can they afford to. Analysts say the cost of buying and installing cable limits rewiring to once a decade for most users.

That makes it critical to consider future application needs when laying plans to rewire buildings.

Although most companies today have an abundance of cable supporting office telephone systems and various forms of data traffic, such as terminal-to-host and local-area networks, the question is whether it will support video and other bandwidth-intensive applications, such as imaging, that are emerging on the horizon.

Net managers who intend to improve premises wiring in the near future need to select a ca-

(continued on page 35)

Novell, Eastman Kodak lay plans for NetWare imaging

Firms enter into partnership to bring imaging capabilities to popular net operating system.

By Caryn Gillooly
Senior Editor

LAS VEGAS — Novell, Inc. and Eastman Kodak Co. last week signed an agreement under which the two companies will incorporate document imaging services into Novell's NetWare network operating system.

The effort promises to be a boon for users because it will enable them to use standard local-area network equipment — such as workstations and NetWare — to support imaging instead of employing proprietary imaging systems. Many imaging applications today are tied to proprietary hardware/software platforms.

In addition, the agreement could spawn a flood of shrink-wrapped imaging applications for use on popular NetWare LANs. These applications promise to be less expensive and easier to implement than proprietary options.

Under terms of the agreement, the companies will build an imaging service into NetWare that enables NetWare client workstations to access an image processing engine much like they access a database server. By doing so, Novell will become the LAN vendor to weave imaging support into a network operating system.

The imaging service, which

(continued on page 57)

Vector's E-mail directory service piques user interest

Start-up garners support from major corporations.

By Bob Brown
Senior Editor

NEW ORLEANS — Some of the nation's biggest electronic mail users are rallying around a start-up that this week will unveil a directory service designed to simplify the exchange of E-mail among companies.

Through the service, users get on-line access to a database of E-mail addresses and E-mail system data from other companies that will make it easier for users to communicate with business partners. The provider of the service, Vector Directory Services, is banking on the anticipated growth in intercompany E-mail as more X.400 interconnections are put into place.

Vector, a Lexington, Mass.-based firm founded in March by E-mail industry veteran Bill Lucas, will introduce its Directory of Messaging Systems service at the Electronic Messaging Association's Electronic Messaging '91 conference here.

Digital Equipment Corp., Exxon Corp. and Texaco, Inc. are among the users that have committed to being listed in Vector's directory database (see graphic, page 6). The service has also been endorsed by the American Petroleum Institute's E-mail committee.

"We're trying to make the E-

(continued on page 6)

FCC establishes legality of Tariff 12 for second time

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — The Federal Communications Commission last week affirmed for the second time the legality of Tariff 12, which integrates several services into a custom package at a discounted price.

The agency was forced to reopen an investigation into the legality of the deals after the U.S. Court of Appeals for the District of Columbia overturned the FCC's 2-year-old decision allowing Tariff 12. In October 1990, the court said the FCC had failed "to turn square corners of administrative law" when it first approved the deals in April 1989.

US Sprint Communications Co. and MCI Communications Corp. said they are not likely to appeal the FCC decision. Although the ruling will have to pass judicial review before being finalized, FCC officials anticipate no problems.

The decision technically applies only to the first four Tariff 12 customers because they were the only ones purchasing service when the first FCC order was made. However, the ruling establishes the guidelines the FCC will

(continued on page 56)

Briefs

FCC opens CATV door a crack. The Federal Communications Commission last week proposed implementing rules that would formally endorse the idea of letting the regional Bell holding companies carry television programming over their networks. The proposal could ultimately encourage the RBHCs to move to all-fiber facilities, which would spur the need for advanced technology such as photonic switches.

But officials from several RBHCs said last week that the ability to provide video transmission services but not TV programming would keep them from investing in new facilities. "The FCC decision does not provide sufficient incentive for us to build fiber-optic networks" throughout the local loop, said Kathy Ahearn, director of federal regulatory policy at Nynex Corp.

The FCC also opened a formal inquiry on whether the RBHCs should be allowed to provide TV programming. Such a step would require Congress to modify the Cable Act.

AT&T quadruples T-3 access sites. In response to growing bandwidth needs, AT&T last week announced that its Accunet T45 Reserved Digital Service is now available in 85 cities, up from 20. The service lets users reserve 45M bit/sec point-to-point or point-to-multipoint links. AT&T said it can provide bandwidth with as little as 15 minutes of notification. Pricing for the service contains usage and mileage elements.

Voice, fax, video for frame relay. Frame Relay Technologies, Inc. (FRT) of Costa Mesa, Calif., and Advanced Compression Technology, Inc. (ACT) of Simi Valley, Calif., last week announced an agreement to jointly develop products capable of transmitting compressed voice, facsimile and video traffic over private frame relay networks at sub-T-1 rates. The companies expect their first joint products to debut early next year.

BT creates X.400 backbone. BT North America, Inc. last week said it will link its X.400 nets in the U.S., U.K. and France into a single backbone, effective January 1992. With the cutover of the backbone, dubbed BT, the Dialcom400 and Gold400 names of the existing X.400 networks in the U.S. and U.K., respectively, will be phased out. Users in all three countries will be able to send messages across the backbone for the same price charged for sending messages within one country.

Switched services group to meet. The Switched Digital Services Applications Forum will hold its next meeting Nov. 5-6 in Atlanta. The meeting is open to users, vendors and consultants. The group's charter is to promote interoperability and use of switched digital network services. Among the areas of focus at the meeting will be the definition of a framework for the development of an Nx56/64K bit/sec interoperability standard and a method of testing that standard. The Switched Digital Services Applications Forum has invited the new Bandwidth on Demand Interoperability Group to join in this effort. For more information, call Diane Thorne at (703) 689-5654.

Transatlantic fiber fixed. Officials with AT&T and France Telecom last week said they have repaired a cut on the Trans-Atlantic Telecommunications (TAT)-8 fiber-optic cable that knocked out TAT-8 service between the U.S. and France on Oct. 12. A fishing trawler dragging nets caused the cut 200 km off the Atlantic coastline of France.

An AT&T spokesman said the cut was repaired Oct. 23 and that TAT-8 service to France was scheduled to resume at 3 a.m. Eastern Standard Time on Oct 26. During the outage, all TAT-8 traffic between the U.S. and France was rerouted over satellite facilities.

SynOptics slashes 10Base-T prices. SynOptics Communications, Inc. last week announced price cuts of up to 50% for 10Base-T products, a move that brings its pricing more in line with the rest of the market. SynOptics made the price cuts partly in response to growing competition and partly to increase its business among midsize companies and departments of large companies. Among the most significant price cuts are those on SynOptics' 12-port Model 2800 Workgroup Concentrator and 12-port Model 3307/3308 10BaseT Ethernet Host Module. The Model 2800's price was dropped 38% to $995, and the Model 3307/3308's price was reduced by 40% to $1,495.

CONTENTS

Industry Update

AT&T unit revamps to improve service. 9
UDS boosts market stance via investment in XcelleNet. 9

Telecommunications

U.S. lead in network technology slipping. 13
Cable & Wireless takes on Big 3 on virtual net front. 13

Data Communications

User downsizes host applications to LANs. 17
IBM to trial multimedia network at gigabit speeds. 17

Local Networking

OURS set to tackle multivendor issues. 23
Cogent Windows tool gives PC users wide data access. 23

Management Strategies

PacifiCorp strives for 'any-to-any' net. 25
House legislation would up software costs. 25

Global Networks

Unilever exec talks global outsourcing. 27
Poland turns to U.S. for help with net upgrade. 27

Products & Services

New SunConnect unit airs first products. 29
DEC beefs up InfoServer net storage. 29

Opinions

Users can benefit from revived secondary mart. 32
Distributed object computing is key. 33
Action Center 46
Networking Marketplace 51
Networking Careers 54

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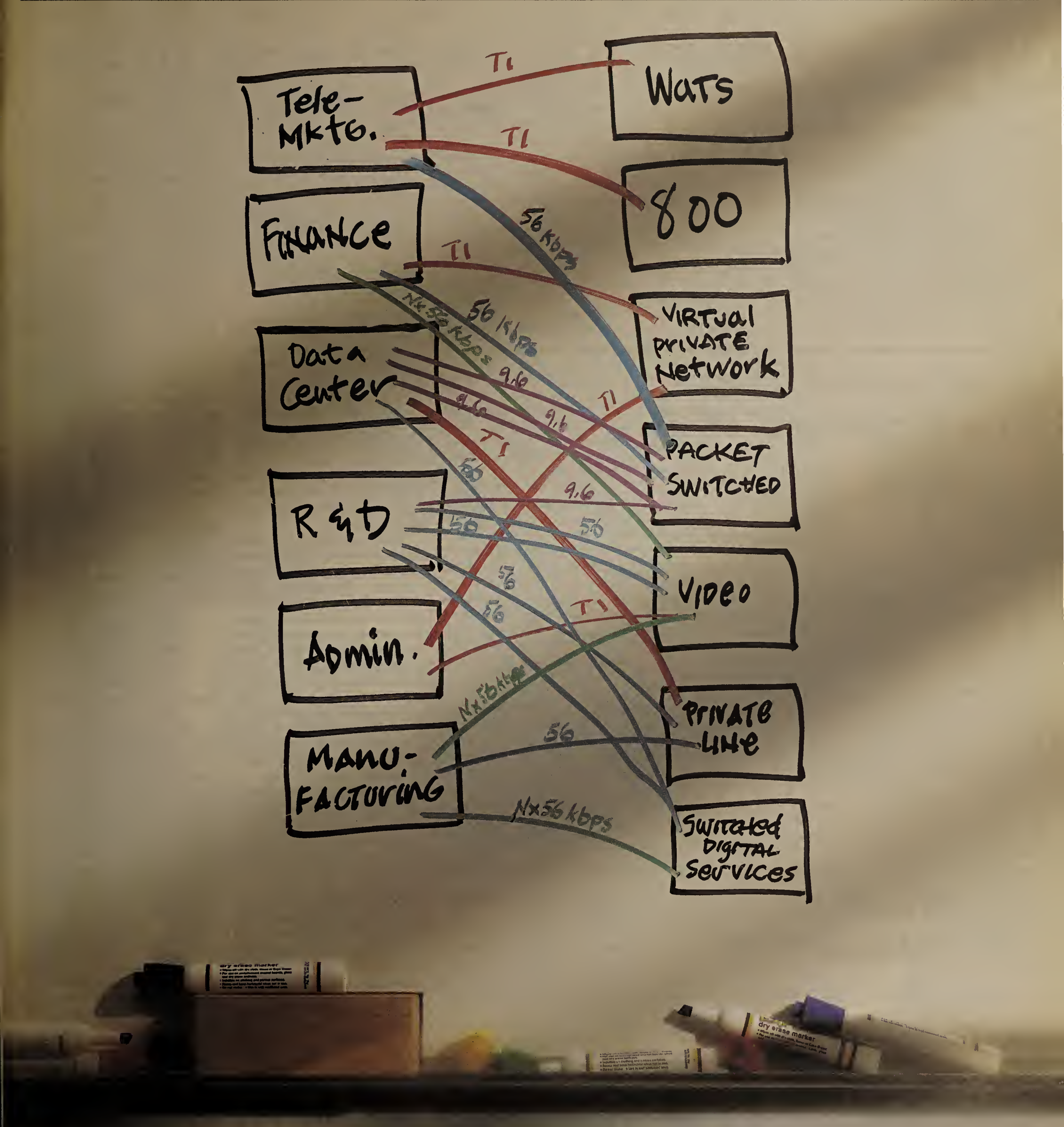
1980 *Sprint introduced the first major public e-mail service.* 1985 *Sprint introduces the world's first virtual private network.* 1987 *Eight million FŌNCARDs℠ distributed in first year.*



NETWORK ON ELM STREET.

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1989 *Sprint completes PTAT-1, the world's first and largest privately owned transatlantic fiber optic cable.* 1991 *Sprint transmits the first commercial video services to the Soviet Union.*

NASA to upgrade national T-1 network to support T-3

Will also add frame relay for X.25, LAN traffic.

By Paul Desmond
Senior Editor

MARSHALL SPACE FLIGHT CENTER, Ala. — Boeing Computer Services Co. last week detailed its plan to upgrade NASA's nationwide T-1 backbone to T-3 and employ frame relay to carry X.25 and LAN internetwork traffic.

The T-3 net, due to be cut over by October 1992, will help the National Aeronautics and Space Administration keep pace with increasing bandwidth demands, while frame relay will help the agency make more efficient use of that bandwidth.

NASA's existing router-based internetwork and X.25 net will share frame relay-based wide-area trunks, as opposed to separate long-haul circuits.

Boeing Computer Services runs the space agency's Program Support Communications Network (PSCN), which is currently a multipurpose T-1 backbone supporting at least 17 major NASA facilities nationwide.

Following a government-approved procurement process, Boeing Computer Services signed a contract with Network Equipment Technologies, Inc. (NET) for at least a dozen IDNX/90 multiplexers, which will be used to upgrade PSCN to T-3, said Dave Sissel, section manager for backbone services at Boeing Computer Services here.

(continued on page 58)

HP adds object-oriented layer to relational DBMS

By Joanne Cummings
Staff Writer

CUPERTINO, Calif. — Hewlett-Packard Co. last week announced a client/server-based object-oriented database management system that can support as many as 500 users.

Because it is written on top of HP's Allbase/SQL relational DBMS, the object-oriented OpenODB offers the multiuser support, security and reliability features usually found only in relational DBMSs. Most other object-oriented DBMSs support only small work groups and cannot yet offer high security and reliability, according to Douglas Dedo, marketing manager at HP.

Shaku Atre, president of Atre/Intec, Inc., a database consultancy in Rye, N.Y., said HP's approach of layering object-oriented technology on top of a relational DBMS makes sense because people have just moved to relational databases from conventional file management systems and are unlikely to move again.

In object-oriented DBMSs, program code is bundled together with data to create objects, Atre said. A customer billing object, for example, would contain all the data pertaining to customers and the program used to calculate bills for those customers.

The fact that the program code is stored as part of the object simplifies the task of creating new applications. If a user wanted to identify customers that had failed to pay their bills within a certain period of time, it could link the customer billing object with a customer debt object without having to rewrite any code.

"It's not magic," Atre said. "You have to design and develop your objects so that they are reusable. If you don't do that, the object-oriented technology is going to be of no use. On the contrary, it's going to be a big performance deterrent."

OpenODB uses the company's object-oriented OSQL language, an SQL-like language that contains object extensions. Dedo said it lets users take advantage of object orientation while retaining their current information systems investment. This is because applications written for relational DBMSs using languages such as C, C++, COBOL, FORTRAN and Pascal can work with HP OpenODB.

OpenODB components

HP OpenODB server software is initially designed to run on HP 3000 and 9000 minicomputers, while client software is available for Unix workstations and personal computers. Clients are linked to servers over Transmission Control Protocol/Internet

(continued on page 57)

IBM, PictureTel to bundle video codecs with PS/2s

By Barton Crockett
Senior Editor

LAS VEGAS — IBM and PictureTel Corp. last week said they are teaming to integrate videoconferencing capabilities into IBM Personal System/2 microcomputers that are expected to be commercially available by the middle of next year.

Initially, the companies plan to bundle PS/2s and PictureTel video coder/decoders (codec) into a single package that could cost less than $25,000, said Colby Mims, program manager for technology and integration at IBM's Personal Systems division.

A PictureTel codec will be attached to a PS/2 and support full-motion videoconferences over switched digital or dedicated links at speeds ranging from 56K to 384K bit/sec. The codec will route compressed video traffic directly into the PS/2 for presentation in a window on a user's screen.

Mapping out the future

In 1993, Mims said IBM expects to integrate the PictureTel video codec onto a PS/2 card. He said a PS/2 with the videoconferencing card could cost between $15,000 and $20,000.

In two to three years, Mims said IBM expects to begin supporting compressed video capabilities on local-area network servers.

This would enable servers to set up videoconferences and route video traffic over a LAN to attached microcomputers.

By early 1994, Mims said he expects IBM to integrate PictureTel's video system into a chipset that would be housed on the PS/2's motherboard. These PS/2s could range in price from $5,000 to $10,000.

"This will basically be the first time that the different worlds of personal computing and videoconferencing will merge at the desktop," said Robert Mitro, PictureTel's vice-president of sales and marketing at the company's headquarters in Peabody, Mass.

IBM and PictureTel an-

(continued on page 57)

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Gov't officials: FTS 2000 too costly, service poor

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — Government officials last week testified that a string of operational, management, pricing and service quality issues under the massive Federal Telecommunications System (FTS) 2000 contract are wreaking havoc in their networks.

Speaking at a Senate hearing here, the users' testimony raised new doubts about the viability of the multibillion-dollar telecommunications contract.

Sen. John Glenn (D-Ohio), chairman of the Senate Committee on Governmental Affairs, hosted the hearing on FTS 2000 to determine whether the government is getting a good deal and whether federal users should be required to purchase services under the contract.

Jack Brock, director of the office of information management and technology division of the General Accounting Office (GAO) reiterated the findings of a GAO report issued last September that said the government was being overcharged when compared to custom network deals, such as Tariff 12 for commercial users.

The report concluded that the government will pay an unnecessary $148 million for switched voice during the next two years.

Federal users — some of whom have gone to Congress asking to be exempted from FTS 2000 — had a chance to air their concerns as well. Some agencies have asked to be exempted from FTS 2000 because they say it is too expensive.

But several users offered up even more disturbing testimony, indicating service quality for data services is poor under the government net. One agency said it has experienced numerous outages, one of which lasted 11 days.

"Any time you have agencies trying to get out from under what is supposed to be a major advance [in telecommunications service], you have to take a look at it," Glenn said.

Officials from the General Services Administration, which oversees FTS 2000, appeared at the hearing in an attempt to convince Glenn that they have the problems under control and improvements are being made. But if things don't turn around soon, Congress could move to drastically revamp the net or dismantle the troubled contract altogether.

But congressional support for the contract has not completely eroded. Rep. Frank Horton (R-N.Y.), the ranking minority member of the House Committee on Government Operations, last week wrote a scathing letter to the GAO complaining about its FTS 2000 report. He said the GAO data indicating overcharges was flawed and unverified.

"If there are problems [with pricing], then those should be addressed," he stated in the letter. "But the problems should be identified based upon careful analysis and review to ensure some degree of accuracy. To do otherwise provides raw meat to the wolves interested in destroying the contract."

The five federal users who testified agreed that service quality for switched voice services under FTS 2000 is good, and they generally agreed that the prices for that service are satisfactory. However, they expressed serious reservations about the price and quality of data services.

> The government will pay an unnecessary $148 million for switched voice.
>
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Diane Fountaine, director of telecommunications for the office of the assistant secretary of defense, said it has serious concerns about FTS 2000 prices and urged Congress to lift rules mandating that agencies purchase service from the contract. She asked Congress to adopt a measure requiring agencies to consider FTS 2000 first, but allowing the option of buying service elsewhere.

At least one unit, the Pentagon, will pay about $1.5 million more for switched voice under FTS 2000 than for the same service previously purchased from MCI Communications Corp.

Fountaine also complained that order processing takes from two to three times longer under FTS 2000 than with previous contracts, but she added that AT&T, the carrier to whose network the armed forces are assigned, has agreed to improve the process.

Donald Demitros, director of the office of information policies and systems for the Department of Housing and Urban Development (HUD), said that under FTS 2000, the agency will pay 35%, or $1 million, more annually for data communications for two networks that handle family insurance claims and other HUD services. Aside from the cost issue, Demitros said installation and performance of data services was satisfactory.

(continued on page 55)

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AT&T gives users a sneak peek at new Definity PBXs

Switches offer migration from current models.

By Bob Brown and Bob Wallace
Network World Staff

MIAMI — AT&T last week gave customers an early look at the long-anticipated new version of its Definity private branch exchange at its PBX user group meeting here.

The new PBX is available in two models — the G3I and the G3R. Definity Generic 1 users can upgrade to either, while Definity Generic 2 users can upgrade to the G3R.

Mark Koenig, AT&T's Definity product manager, said upgrading from existing Definity models to the new G3s will improve the switches' call handling capabilities and enable them to support more advanced features.

The G3I will be able to support a maximum of 1,600 lines and 400 trunks, and handle up to 10,000 busy-hour call completions.

The G3R will support a maximum of 10,000 lines and 4,000 trunks, while it can handle more than 100,000 busy-hour call completions, Koenig said.

To upgrade to the G3I, Definity Generic 1 customers can swap out software and add memory that will boost the switch's busy-hour call completion capacity from 7,200 to 10,000.

To migrate to the G3R, Generic 1 users will have to replace the PBX's current Intel Corp. 80286 processor with a Reduced Instruction Set Computer (RISC) processor and change its common control software.

To upgrade, Definity Generic 2 users will add new software and replace the current 501CC processor with the RISC processor.

The G3R allows for wider deployment of multiple remote switches. The Generic 2 supports fiber links to remote switches, which must be located within five miles of the main switch. G3R users will be able to use T-1 lines

(continued on page 58)

OMG to release network architecture component

By Jim Duffy
Senior Editor

NEW YORK — The Object Management Group (OMG) this week will unveil the first component of its nascent architecture for developing object-oriented applications that run in distributed computing environments.

At a press conference here tomorrow, the consortium will unveil Object Request Broker, a set of programming interfaces that could spur development of distributed networked applications.

The broker software will enable object-oriented applications to exchange messages via remote procedure calls (RPC). Applications written to support the broker would issue a request for data and rely on the broker to locate it and issue calls to transmit the data to the user.

"The industry is going to see a whole new class of distributed applications," said Joe Forgione, a member of OMG's board of directors and vice-president of sales and marketing for HyperDesk Corp., a Westborough, Mass., start-up that contributed technology to the project.

The software will reside on client workstations in a network. Through the broker, net objects — components that contain a collection of related procedures and data — can transparently issue requests and receive responses to initiate specific tasks, Forgione said.

Users, for instance, can click an icon called Report on a workstation screen to invoke a series of routines stored as an object on a network server. The worksta-

(continued on page 55)

Unisys turns to US West for self-healing metro network

By Maureen Molloy
Staff Writer

MINNEAPOLIS — Unisys Corp. last week said it has signed a five-year contract with US West Communications, Inc. for a self-healing, fiber optic-based carrier service that will keep the company's networks running in the event of a local link or central office outage.

Unisys said it chose the service because it needs fail-safe, high-capacity voice, data and video links between multiple sites within the Twin Cities region. The Self-Healing Network Service (SHNS) is a 45M bit/sec offering designed to automatically restore communications within milliseconds of a network disruption.

"We're primarily attracted to the survivability features of the service," said David Hilger, manager of Unisys' Corporate Network Engineering department. "And second, to its cost-effectiveness."

The service, which boasts a 99.99% availability rate, is provided by linking three Unisys sites in the Minneapolis-St. Paul area to the US West Communications central office switch in a serial fashion, using two concentric, counterrotating T-3 fiber-optic rings.

> The rings — a primary path and a protected path — each transmit in one direction only.
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The rings — a primary path and a protected path — each transmit in one direction only. If the primary path is disrupted, intelligent network elements at the Unisys sites and US West Communications central offices "heal" the net within milliseconds by diverting traffic to the safe ring.

Hilger said the SHNS setup is less expensive than adding multiple redundant T-3 lines to the network and enhances availability by automatically identifying and correcting net disruptions before they can affect operations.

The company, which began using the service last summer, anticipates further cost savings because traffic that previously ran across a corporate metropolitan-area T-1 backbone network is now consolidated on the US West Communications T-3 fiber-optic network.

"We've essentially taken a lot of local-loop connections and point-to-point connections between sites and consolidated them all onto the T-3 ring," Hilger said.

The SHNS ring is connected to other Unisys locations throughout the U.S. and Europe via Timeplex, Inc. Link/2 multiplexers, thereby enabling users in the Twin Cities area to access Unisys' sites worldwide.

In addition to the assurance of uninterrupted communications among key facilities in the Midwest, Hilger said he was also sold on US West Communications' service guarantee. The carrier will award one month of free service to any customer that experiences network downtime of one second or more.

Vector service piques interest

continued from page 2

mail administrator's job easier," Lucas said. "This could cut the time it takes to find an E-mail address for another company from hours or days to minutes or seconds."

The Vector directory service promises to increase the value of users' E-mail systems, said Marion Weiler, chairman of the American Petroleum Institute's E-mail user group and supervisor of IBM Professional Office System/host-based office products at Chevron Industries, Inc.'s Information Technology Co. in San Ramon, Calif.

E-mail user directory

Sample of companies listed in Vector's E-mail directory:

American Cyanamid Co.
Association of American Railroads
The British Petroleum Company PLC
The Chase Manhattan Bank, N.A.
Chevron Industries, Inc.
Conoco, Inc.
Consolidated Rail Corp.
Continental Grain Co.
Control Data Corp.
Digital Equipment Corp.
E.I. du Pont de Nemours & Co.
Eli Lilly & Co.
Exxon Corp.
Fina Oil and Chemical Co.
GTE Corp.
Monsanto Co.
NCR Corp.
Nordstrom, Inc.
Pennzoil Co.
Phillips Petroleum Co.
Ryder System, Inc.
Soft-Switch, Inc.
Texaco, Inc.
John Wiley & Sons, Inc.

SOURCE: VECTOR DIRECTORY SERVICES, LEXINGTON, MASS.
GRAPHIC BY SUSAN J. CHAMPENY

"We'll be able to save time and effort establishing E-mail connections with other companies," he said. "We've got great E-mail networks in place that grow daily, but there's no real directory structure in place to support communications between them."

Vector has been running a pilot test of its directory since August. About 30 companies representing roughly half a million E-mail users have committed to listing E-mail data on the database. Another 20 companies have expressed their intentions to list in the directory, which Lucas expects to make operational later this year. Over time, Lucas hopes to have thousands of user companies listed in the directory.

"The directory will become most useful once we have a critical mass of users listed," he said.

The directory service database houses information about companies' E-mail systems. For example, it contains listings of corporate E-mail addresses, the public messaging networks that can be used to access a company's E-mail system and operational aspects of the E-mail systems, such as whether registration is required to send or receive E-mail.

Other data includes compliance with optional segments of the X.400 standard and mailbox addresses for testing E-mail submissions.

The database information is being solicited from participating companies via a questionnaire.

Using the directory is straightforward. Subscribers can access the database, which is being maintained on computers at Control Data Corp., by dialing into the service bureau's X.25 packet network from a desktop terminal or personal computer.

Users would then be presented with a menu that would enable them to seek data about a certain company and move to another menu of more detailed information.

"Access to this information gives users a place to start in establishing communications with other companies," Lucas said.

The directory service does not provide for any kind of E-mail transmission or routing; companies still need to make their own network connections.

Down the road, Lucas said he hopes to add features such as individual user addresses, public messaging service directories and addresses, and X.500 addresses to provide a migration path to X.500-based directories.

Vector announced pricing for 1991-1992 and beyond. Through mid-1992, companies can be listed on the directory database for free. For $700, users can also receive quarterly print directories, get an on-line account that includes an hour of free connect time and contribute to the design of the information.

Pricing after 1992 is approximate. Vector plans to charge $35 a year for the data entry associated with listing a company. (This may change if an on-line data entry method is implemented.)

The print directory will cost $295 a year with the right to copy for internal use. On-line access to the directory will cost $25 an hour, and transactions will cost 20 cents per query by mail or X.500 request.

According to Mike Zisman, president of Soft-Switch, Inc., a Wayne, Pa., E-mail gateway maker that has agreed to be listed in the Vector directory, the start-up is filling a need that will become greater in years to come.

"There is going to be a significant lag between the widespread adoption of X.400 as a means of enterprise electronic mail and of X.500, which is the directory," Zisman said. "It is that gap that creates both a need and an opportunity for someone like Vector."

For more information, call Vector at (617) 862-7607.

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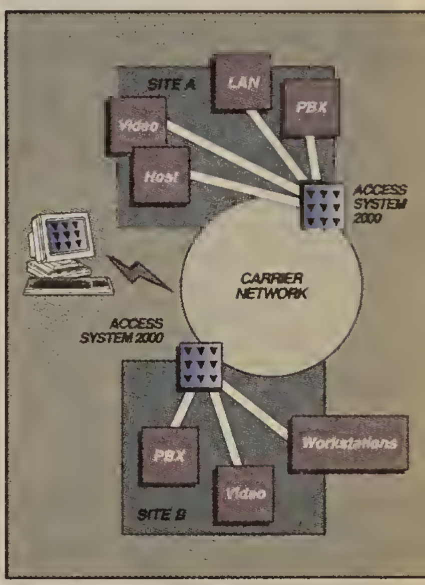

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MCI eyes role in net venture

continued from page 1

"We think the next step will be to have global networks [to provide outsourcing services]," he said.

He added that the German carrier expects to join a consortium eventually to build a global outsourcing network. But the spokesman, along with officials at France Telecom and MCI, declined to discuss the negotiations publicly.

A top official with one of the carriers who requested anonymity and is directly involved in the trilateral talks, however, disclosed several details about the venture DBP Telekom, France Telecom and MCI are discussing.

Focus on voice

According to the official, the carriers could use their net to provide global private networks with guaranteed service levels. They could also enable users to reserve digital bandwidth on the networks. Additionally, the carriers could bid to maintain user net equipment and obtain local-loop circuits from monopoly carriers.

The three carriers said they expect most of the traffic on their global broadband network will be voice.

Although the net would not support public switched voice service, the official said the carriers would try to strike agreements to route traffic between the global broadband net and domestic carriers' public switched networks.

The official said the three probably would work closely with Infonet Services Corp., an international value-added network (IVAN) service provider based in El Segundo, Calif. MCI is Infonet's largest shareholder, owning 25% of the IVAN, while DBP Telekom and France Telecom each own 16%.

Majority rules

The official, who is also closely associated with Infonet said the three carriers considered offering private net outsourcing services via Infonet's global, X.25 and Transmission Control Protocol/Internet Protocol network.

But the carriers were concerned that they would not have enough control over the venture because any action could be vetoed by Infonet's eight minority shareholders.

These minority shareholders — which are national carriers in Australia, Belgium, the Netherlands, Singapore, Spain, Sweden and Switzerland, as well as Japan's dominant international carrier, Kokusai Denshin Denwa Company, Ltd. — each own about 5% of Infonet.

The source said Infonet would likely obtain bandwidth from the consortium's global broadband network and Infonet personnel would also likely sell and support the consortium's services.

Although the three carriers have not yet signed an agreement, the source said he believes there is a greater than 50% chance that they will launch the venture. If so, an announcement could be made within months.

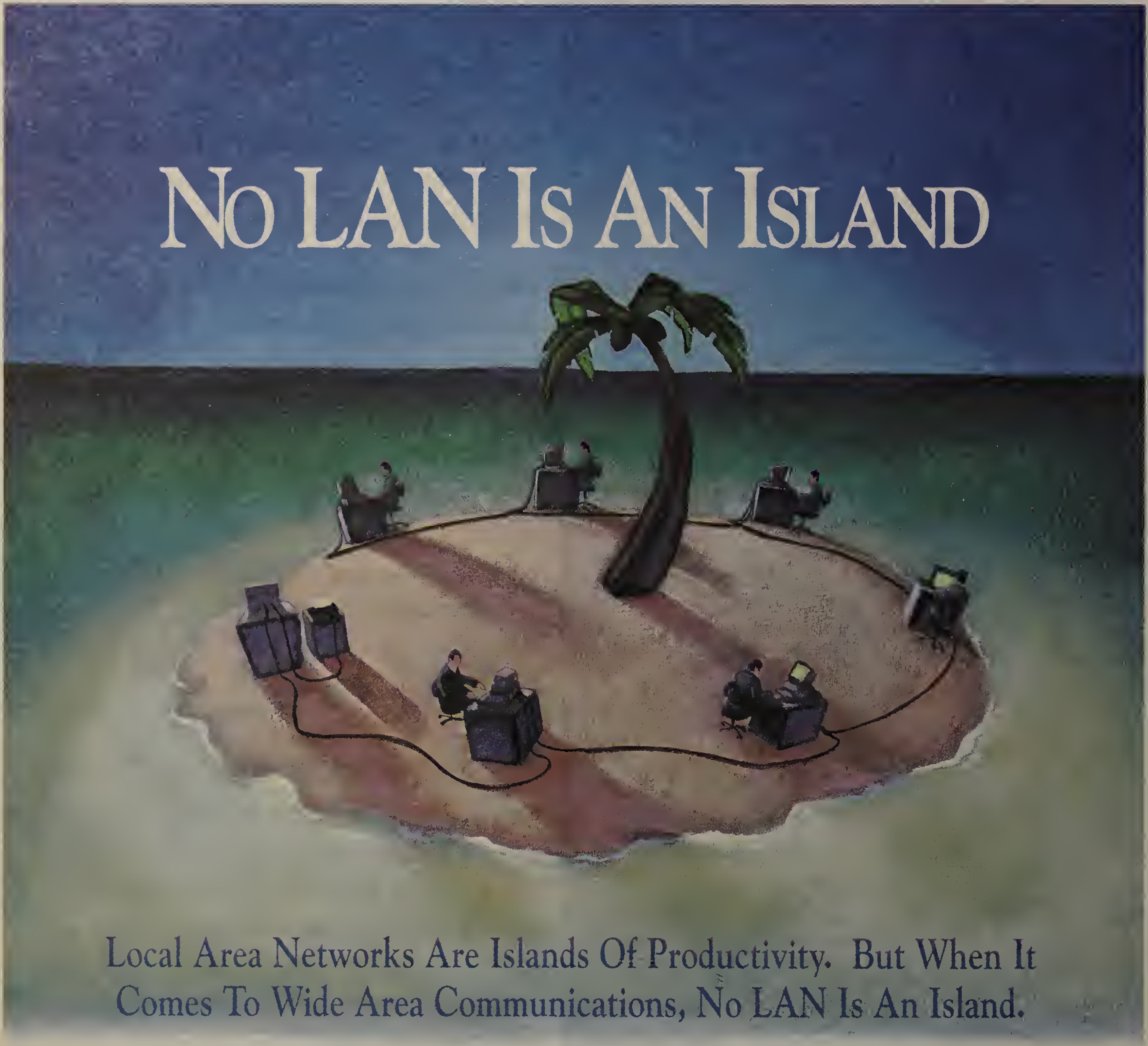
Competition from BT

The source said the three carriers see the venture as a direct response to Syncordia Corp., a global net outsourcing unit that British Telecommunications PLC (BT) launched last month. Syncordia plans to offer private net outsourcing services in the three carriers' domestic markets, and they don't want to concede market share to BT.

"Everything happened when BT announced Syncordia," the official said.

BT is courting DBP Telekom and Japan's Nippon Telegraph and Telephone Corp. as partners in Syncordia. The source said he believes it is more likely that DBP Telekom will work with France Telecom and MCI than with BT because DBP Telekom would only be a junior partner in Syncordia but an equal partner in the France Telecom-MCI consortium.

Also, it would be politically and economically difficult for DBP Telekom to ally with BT since BT competes with Infonet. Additionally, DBP Telekom now has a close relationship with France Telecom. ◪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INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

Ellen Hancock, IBM vice-president and general manager for networking systems, told attendees at the recent NetWorld 91 Dallas that IBM customers' top needs are interconnecting LANs, imaging and global networking.

People & Positions

Oracle Corp., a Redwood Shores, Calif., maker of database software, last week named **Fred Cutler** to the newly created position of vice-president of business development. Cutler will be responsible for worldwide business development, including partnerships and joint ventures with other vendors.

Previously, he was senior director of strategic marketing at Compaq Computer Corp., where he was responsible for product planning, software marketing and advanced architecture planning.

NCR Corp. recently announced several new appointments in conjunction with the creation of a new Affiliate Sales Division within its United States Group (USG) responsible for product sales to **AT&T**, NCR's parent firm.

Peter Serbanic has been named vice-president of the Affiliate Sales Division with responsibilities for the direct sale of NCR products within AT&T. He will work closely with William Patchett, vice-president of USG's Telecommunications Division, who is responsible for marketing activities within the telecommunications industry. Previously, Serbanic was director of Affiliate Sales for AT&T Computer Systems.

William Schnarr, who has been appointed assistant vice-president of systems services, will be responsible for providing technical support for the division. ◻

UDS boosts market stance via investment in XcelleNet

Plans to use software skills to augment hardware.

By Bob Brown
Senior Editor

HUNTSVILLE, Ala. — In a bid to better position itself in the fiercely competitive network equipment market, Motorola, Inc.'s Universal Data Systems, Inc. (UDS) subsidiary recently acquired a 12% stake in XcelleNet, Inc., an Atlanta-based developer of network software.

Under the agreement, for which financial terms were not disclosed, UDS has an option to buy an additional 8% of XcelleNet shares at a later date. Also, UDS President George Grumbles will join XcelleNet's board of directors.

UDS, which makes modems, data service unit/channel service units, multiplexers and other network gear, plans to add value to its existing product lines and enter new markets by acquiring software expertise via XcelleNet.

XcelleNet sells software that enables users to distribute and access applications across networks.

"Our expanded relationship with XcelleNet sends a strong message that we are more than just another modem company," Grumbles said.

According to XcelleNet's President Dennis Crumpler, the firms have complementary businesses — both are concerned with the transmission of information to and from large numbers of remote sites.

> UDS has an option to buy an additional 8% of XcelleNet shares at a later date.
>
> ▲▲▲

UDS' investment in XcelleNet builds on a joint marketing and development agreement penned by the two companies last April under which they have worked to link two of their respective products.

UDS soon plans to demonstrate its GlobalView Network Management System running in tandem with XcelleNet's Remote

(continued on page 10)

INDUSTRY BRIEFS

NET posts loss due to lawsuit settlement. Network Equipment Technologies, Inc., a Redwood City, Calif., maker of multiplexers and other network gear, last week reported a net loss of $12.6 million for the second quarter ended Sept. 29, an improvement compared to the $7 million net loss for the corresponding period last year.

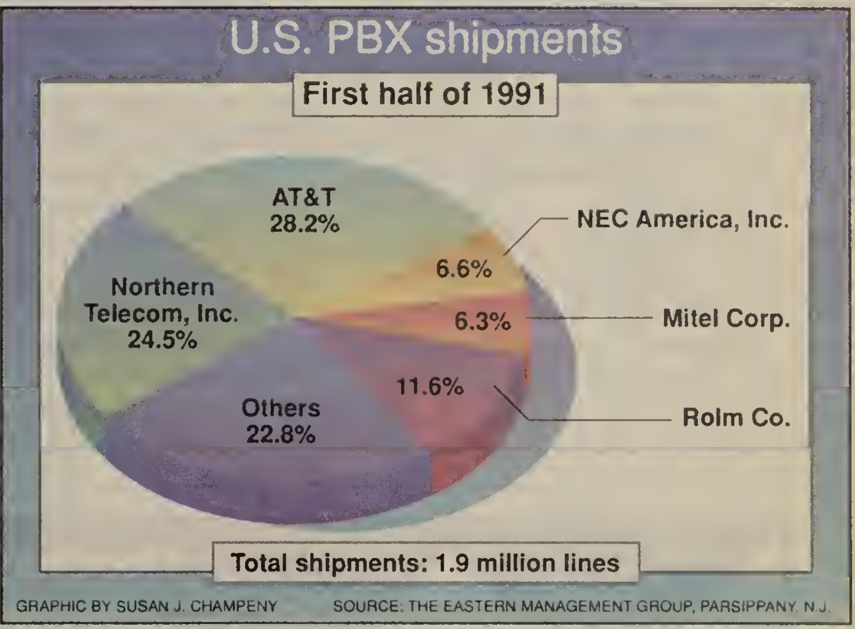
Results for the second quarter were negatively affected by a charge of $13.4 million resulting from the settlement of consolidated class action lawsuits brought against the company for alleged securities laws violations. Excluding this charge, net income would have been $732,000 for the second quarter.

Revenue for the quarter was $42.2 million, up 13.7% from $37.1 million in the same period last year.

IBM forms APPC group. IBM recently announced the formation of an APPC Market Enablement group, an eight-person team charged with helping vendors and users develop applications or configure networks that use Advanced Program-to-Program Communications.

The group is responsible for putting together classes and catalogs. It currently offers two new catalogs that list dozens of IBM and non-IBM APPC software development tools, books, manuals and classes available on APPC, Advanced Peer-to-Peer Networking and Common Programming Interface for Communications. To receive catalogs or other information from the group, write to APPC Market Enablement, IBM, Dept. E42, Building 673, P.O. Box 12195, Research Triangle Park, N.C. 27709, or send a note via the Internet to: appcmrkt@ralvm6.vnet.ibm.com.

(continued on page 10)



GRAPHIC BY SUSAN J. CHAMPENY SOURCE: THE EASTERN MANAGEMENT GROUP, PARSIPPANY, N.J.

AT&T unit revamps to improve service

New president discusses PBX firm's plans to streamline processes, new product strategy.

By Bob Brown
Senior Editor

MIAMI — AT&T's Business Communications Systems (BCS) group is undergoing a major restructuring that will reduce head count and streamline operations but will actually improve customer service, a top AT&T executive told *Network World* last week.

Jerre Stead, who became president of BCS on Sept. 1, said that while BCS is consolidating its service and support staffs, it is also planning for the rollout of new products in key emerging markets and expanding its international sales, among other things.

Still behind the eight ball

Two weeks ago, Robert Kavner, AT&T group executive for communications products and federal systems, said during a conference call on AT&T's financials that BCS is undergoing a restructuring in an effort to again become profitable.

Ironically, AT&T has sold more private branch exchange lines in the U.S. than any other vendor this year, but it is still losing money (see graphic, this page).

Stead, who addressed these issues in a letter to AT&T PBX users this month and at a user meeting here last week, said he expects BCS to return to profitability in 1993 or 1994.

"We're not doing this restructuring from the standpoint of going in with an ax and slicing off pieces," he said. "It's a total overhaul of our processes. We're reengineering them to make them simpler, faster and more cost-effective."

Despite the cutbacks under way, Stead said BCS' restructuring will make the company more responsive to user needs. Among other things, BCS is consolidating field support at its new technical service center in Denver, which opened in January.

The company will rely heavily on remote diagnostic capabilities to speed customer service, he added.

Full speed ahead

BCS is also rolling out its Complex Provisioning Program, an effort to speed the process "from quote to cash" of installing and cutting over BCS products following a sale, Stead said. The program has been designed to cut by 40% the number of people involved in the processing of each product order.

The program has also given AT&T the flexibility to allow customers to change PBX configurations before installation on two weeks notice, as opposed to two or three months notice in the past, he added.

BCS does not plan, as some observers expect, to dump its direct sales force in favor of distributors. Stead, who has managed both direct and indirect sales programs at previous companies, said he believes BCS' direct sales force offers AT&T a competitive edge.

In fact, he said BCS' sales force just recently focused on selling only BCS offerings, as opposed to all other AT&T gear, a change that should improve the sales force's expertise.

Stead acknowledged that BCS is testing the reseller waters in several states but only as a way to complement the company's direct sales.

(continued on page 10)

UDS boosts market stance via XcelleNet

continued from page 9

Applications Management System on a personal computer running OS/2.

This would, for example, enable a net manager to examine a network's hardware in the case where XcelleNet's applications server failed to distribute applications to certain remote sites.

Down the road, UDS will work with XcelleNet to incorporate software functions into the UDS modems and other network hardware, according to Bill Schlosser, director of business development for UDS.

This might be useful in providing an easier upgrade of existing products to support emerging network technologies and services, such as frame relay and high-speed switched digital services, he said.

"There's a high software content needed to support these services," Schlosser said. "We're looking at more of a system sale to support users' high-bandwidth needs, not just selling them a box."

Curtis Price, an analyst at International Data Corp., a Framingham, Mass., market research firm, said UDS and other modem makers are wise to branch out beyond the traditional modem market.

"Software will be a key for UDS in delivering products with more intelligence to support capabilities such as remote diagnostics and flexibility," he said. ☐

AT&T unit revamps to improve service

continued from page 9

"We have the only total network of sales, service, installation and support organizations in the U.S., and it is our intent to make that stronger and more cost-effective as we do the reengineering of all our processes," he said.

Among the new services BCS plans to offer is outsourcing, although Stead declined to offer further details.

In with the new

While BCS already sells voice mail and PBX-to-host products, the business group will place more emphasis on delivering new products in those market segments, which are growing much faster than the traditional PBX market.

Meanwhile, AT&T last year started to get rid of older product lines, such as a paging system dubbed Hoot 'n Holler and various electromechanical switches, and will continue this process through next year, freeing up research and development resources, according to Stead. No major project lines are expected to be curtailed any time soon.

AT&T also plans to expand its presence internationally, he said.

Although AT&T is ranked at the top of the U.S. PBX market, it is only the fourth- or fifth-ranked vendor worldwide, analysts said. Among other things, AT&T will try to leverage recently acquired NCR Corp.'s extensive international service and installation presence in order to boost sales of BCS products overseas, Stead said.

"The majority of our revenue dollars comes out of the U.S.," he said. "I would hope that by the end of this decade, some 35% to 40% of our revenue dollars would come internationally."

Jerre Stead

Industry observers said changes to BCS come as no surprise.

"The U.S. CPE market is a $6 billion business, and virtually everyone is losing money in it," said David Yedwab, a vice-president at The Eastern Management Group, a market research firm in Parsippany, N.J. "We're seeing all of the major players rethink their approaches to the market." ☐

Industry Briefs

continued from page 9

Prime licenses technology. Retix, a Santa Monica, Calif., maker of Open Systems Interconnection-based products, last week announced an agreement to license a range of OSI products to Prime Computer, Inc. of Natick, Mass.

Under the agreement, Prime will license a series of Retix OSI source code products for inclusion in Prime's line of Unix-based computers. Initially, the agreement includes File Transfer, Access and Management (FTAM) and X.500 Directory Services. The companies expect to extend the agreement to include X.400 (1988 version), which will replace Prime's current X.400 (1984 version) product, and Virtual Terminal down the road.

Prime's U.K. organization will be the first subsidiary to use the Retix OSI products to meet U.K. government needs. ☐

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TELECOMMUNICATIONS

CARRIER SERVICES, CENTREX, CPE, WIRING SYSTEMS AND BYPASS

Worth Noting

Circle K Corp.'s monthly Software-Defined Network (SDN) service bill weighs between 70 and 80 pounds, according to Harry Heinze, the firm's communications manager. The convenience store chain runs a 3,900-site SDN.

Carrier Watch

MCI Communications Corp. last week announced it beat out rivals AT&T and US Sprint Communications Co. for a five-year, $21 million contract to provide network services to UNOCAL Corp.

Under the agreement, MCI will be UNOCAL's primary carrier, providing Vnet virtual network, MCI Card, 800, private-line and data transmission services.

Ron Warren, chairman of the special UNOCAL committee charged with selecting a primary carrier, said, "Our decision was influenced by MCI's net technology and UNOCAL's need for a billing system broken down by division, region, business unit and location."

Metropolitan Fiber Systems, Inc. (MFS) recently announced it has completed a 77-mile expansion of its fiber-optic network in Houston. The network now serves businesses based in several area shopping centers, as well as other sites.

The expansion raises to 250 the number of buildings served by the MFS fiber network, according to an MFS spokesman.

Users served by the network will be able to use MFS' recently announced local-area network interconnection services, which operate at speeds up to 100M bit/sec.

MFS began offering network services to users in Houston in 1990. ◻

Cable & Wireless takes on Big 3 on virtual net front

VNS integrates several long-distance services.

By Daniel Briere
Contributing Editor

The expected introduction this week of a new, mid-range virtual network service from Cable & Wireless Communications, Inc. will undoubtedly give the established virtual network providers, including AT&T, MCI Communications Corp. and US Sprint Communications Co., something to ponder.

ANALYSIS

Cable & Wireless' Virtual Network Service (VNS) is aimed at users in the $500 to $50,000 monthly price range — particularly those in the $500 to $25,000 per month spending band. This is a range where Cable & Wireless is already competitive, and VNS will bolster the carrier's position in this market.

What will give users and vendors pause is not simply that VNS is a new competitive entry, but the degree to which it integrates various services into one product offering.

Cable & Wireless is offering outbound calling, toll-free services and travel card options from a single switch platform under a single discount plan with a single pricing structure. Billing will be handled through an integrated system.

VNS illustrates a growing trend in virtual networks — the integration of related products under a single service umbrella. These Integrated Network Services, under which carriers offer a broad range of network capabilities in a single pricing plan, will soon grow to include Centrex services, virtual data services, virtual private lines and advanced network processing capabilities.

Designing such functionality into a single product places Cable & Wireless in a strong position against its established competitors.

"We designed VNS to be the next generation of virtual network services," said Connie Beyer, Cable & Wireless vice-president of marketing. "No other carrier can offer even close to this level of service functionality under one integrated product."

To a large extent, current virtual network service competitors do not offer the same functional-

(continued on page 14)

WASHINGTON UPDATE

BY ANITA TAFF

AT&T makes an appeal for Tariff 15 deals. AT&T turned the heat up another notch on the Federal Communications Commission last week by asking a U.S. federal appeals court to issue a stay holding up the FCC's decision to reject the carrier's Tariff 15. It was the second time in five days that AT&T went to court to try to salvage Tariff 15.

The FCC has rejected five Tariff 15 deals and ordered AT&T to withdraw them. Also at risk are 12 other Tariff 15 deals — eight of which are in effect and four of which are currently suspended while the FCC investigates them.

On Aug. 1, the FCC ruled that the customer-specific discount deals offered by AT&T through Tariff 15 were unlawfully discriminatory and told the carrier it would have to begin withdrawing them. Tariff 15 allows AT&T to make off-tariff service deals to certain customers in response to similar deals offered by rivals.

In late September, AT&T filed a revised tariff with the FCC that it said corrected the discrimination problem and asked the agency to put a stay on its order until it determined whether to let the new version take effect. Earlier this month, AT&T filed to have the U.S. Court of Appeals for the District of Columbia review the FCC's order judging Tariff 15 to be illegal.

In its court filing last week, AT&T asked for a stay so it won't have to withdraw its Tariff 15 deals until the appeal is complete. The carrier told the court that a stay is essential because it believes it will win on appeal and, without the stay, service will be disrupted and the carrier will be unable to compete. "The findings [in the FCC's Tariff 15 order] are contrary to the record, are contrary to common sense and are irrational," AT&T told the court. ◻

Competitive network snapshot

Country	Percentage of digital switches by subscriber lines	Percentage of electronic switches by subscriber lines	Fiber route kilometers per 1,000 population	Percentage of ISDN coverage by equipped access lines	Percentage of offices with Signaling System 7 capability
Canada	51.4%	57.9%	2.78	NA	8.4%
France	70.7%	75.9%	1.58	100%*	47.6%
Italy	16.1%	17.6%	NA	NA	NA
Japan	31.0%	44.8%	NA	69.0%	NA
U.K.	38.0%	23.5%	NA	NA	6.2%
U.S.	42.5%	96.6%	1.27	0.1%	6.3%
Western Germany	2.6%	44.8%	0.31	NA	NA

* Estimated

NA = Not available

Based on 1989 figures, which are the most recent available.

SOURCE: NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION, WASHINGTON, D.C.

GRAPHIC BY SUSAN J. CHAMPENY

U.S. lead in network technology slipping

NTIA report cites public network shortcomings, advises eased regulations to spur competition.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — The U.S. has one of the best telecommunications networks in the world, but the nation may be at risk because other countries are moving faster in deploying advanced network technologies, according to a government report released last week.

The National Telecommunications and Information Administration (NTIA), an advisory agency to the executive branch, issued the report after 22 months of study and consultation with companies in the industry. The report examined the status of the U.S. public network, including current and planned investment in key technologies in the U.S. and abroad as well as corporate use of network services.

The report found that the U.S. network is increasingly vital to corporations in improving customer service, cutting costs, boosting efficiency and maintaining competitiveness with foreign countries. To encourage carriers to continue upgrading the network, the NTIA concluded that the U.S. should adopt policies that reduce regulation and increase competition.

The NTIA report found that virtually every industry sector relies heavily on networking today. In the service sector, which includes brokerages, insurance companies and retailers, telecommunications has always been important but has become more so over the past few years.

For example, the NTIA found that there are 53,000 point-of-sale terminals in use in the U.S handling 12.4 million transactions per month. The report also discussed use of POS coupled with electronic data interchange to cut costs and improve inventory management.

Manufacturing firms also rely on networking more in product design, inventory control, improving customer service and reducing expenses. For example, since implementing its inventory system, Chrysler Corp. has cut costs by $700 million in 40 assembly plants and reduced paperwork by 20% through a network-based inventory analysis system.

Along with its findings on the vital importance of networking to U.S. industry, the NTIA expressed concern that many of the sophisticated applications in use today are implemented on private networks and that smaller businesses and residential users do not have access to equal technology through the public network.

The NTIA's analysis of investment in the public network yielded mixed results. Although the U.S. has emphasized modernization efforts and has taken a leadership role in the installation of electronic switching equipment, it lags behind other countries in overall expenditures on the public network and in the deployment of such technologies as Common Channel Signaling System 7.

"The ambitious deployment schedules of other countries should cause U.S. firms to evaluate their own plans and U.S. policymakers to reexamine policies that may be hindering the achievement of efficient levels of

(continued on page 14)

Cable & Wireless takes on Big 3

continued from page 13

ity. For example, MCI's Vision, positioned to address small to midsize businesses, and its Vnet virtual network service both lack a toll-free service.

AT&T's competitive virtual network offering at this level, Basic Software-Defined Network (SDN), only offers outbound calling. It does not include SDN Card or toll-free access. US Sprint's Virtual Private Network is also without an integrated toll-free service.

The key issue is the integration of the carriers' underlying network architectures. With the three major U.S. carriers, these diverse services are often provided over separate architectures, making it difficult to offer the same functionality in a single system. While the pricing and services may be consolidated through post-process billing systems and support structures, the base architectures are still separate.

VNS is driven by a single network of 43 Cable & Wireless-designed switches that support out-of-band signaling. In this way, VNS can combine the overall capabilities of Cable & Wireless under one product. Each of those capabilities provided by VNS is also available through stand-alone services as well, although the carrier expects most multisite firms to migrate to VNS.

There are limits to VNS integration. Conference calling, facsimile services and private-line services are not covered by the VNS discounts.

The VNS pricing strategy positions the product to be a low-cost product for typical multisite users. Calls are billed in six-second increments, with international calls subject to a minimum 30-second duration.

But the most interesting aspect is that all intracompany calling is defined as on-net and is discounted by 15%, regardless of termination. Switched termination is charged at a somewhat higher rate.

Switched access outbound rates are about 18 cents per minute for peak business day usage within 100 miles and 21 cents per minute beyond that distance. Switched access, on-net intracompany calling is approximately 15 cents and 18 cents per peak minute, respectively.

Dedicated access outbound rates are about 13 cents per minute for peak business day usage within 100 miles and 15 cents per minute beyond that. Dedicated, on-net intracompany calling is about 11 cents and 13 cents per peak minute, respectively. There is a 20% discount for off-peak usage.

All usage under VNS is subject to a tiered discount structure offering as much as a 30% reduction. VNS offers both a month-to-month and an 18-month term discount structure.

The offering is strong on international discounts. International calls are discounted at the same rate as domestic calling, which can range up to 30%. "We also add a 15% discount off standard rates to the customer's Global Priority Number and another 5% off standard rates to the Global Priority Country," Beyer said, referring to two customer-selected bonus plans.

VNS offers a range of billing and management reports, which is historically a strong suit of Cable & Wireless.

What VNS lacks is depth in sophisticated features common to many higher end virtual network services.

"Right now, if customers want virtual [foreign exchange], virtual network ringdown or switched data, VNS is not for them," Beyer said. She noted, however, that Cable & Wireless will launch two major enhancements to the product's billing and switched data features within the next few months.

Such introductions will increase Cable & Wireless' customer base in the lower end of the market by improving VNS. They will also serve notice to the Big Three that there is strong market competition.

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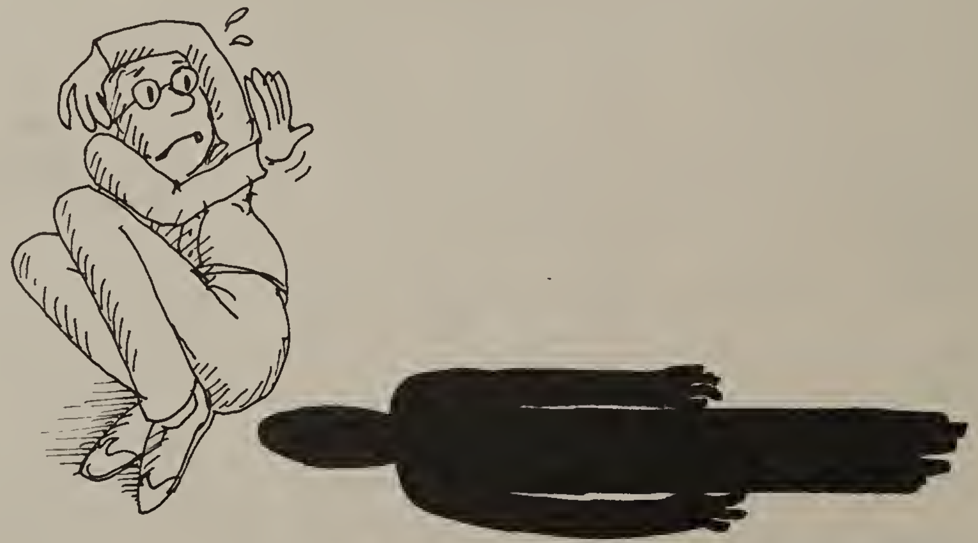

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U.S. lead in network technology slipping

continued from page 13

investment in infrastructure development in this country," the report said.

The NTIA report did not cover new ground — most of the issues discussed are the focus of current Federal Communications Commission, congressional or court proceedings — but rather attempted to provide a comprehensive overview of the telecommunications industry.

Despite voluminous and often contradictory comments submitted by 130 industry and user groups, NTIA's suggestions on the regulatory and legislative changes needed to spur improvement of the U.S. network contain few surprises and are largely unchanged from the policies supported by NTIA officials when the study was launched in 1990.

At that time, NTIA Chairwoman Janice Obuchowski said that restrictions such as the business bans contained in the Modified Final Judgment would likely have to be lifted to encourage investment in the network. Since then, the NTIA has publicly supported efforts to lift those restrictions.

In last week's report, the agency maintained that the business bans should go. It dismissed concerns that removing the bans could give the regional Bell holding companies too much market power and enable them to drive out competitors, saying those concerns are overstated and can be dealt with through accounting rules.

The NTIA also reaffirmed support for forms of incentive regulation, such as price caps, that it endorsed in 1990.

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DATA COMMUNICATIONS

PRODUCTS, SERVICES, ARCHITECTURES, STANDARDS AND NETWORK MANAGEMENT

Worth Noting

According to the Datapro Information Services Group of Delran, N.J., 53% of the T-1 multiplexer users responding to a recent survey said their multiplexer does not yet support frame relay. Of those, 59% said they will be investigating the option. The survey of 400 users also found that 75% are not planning to upgrade to a T-3 multiplexer within the next year.

Data Packets

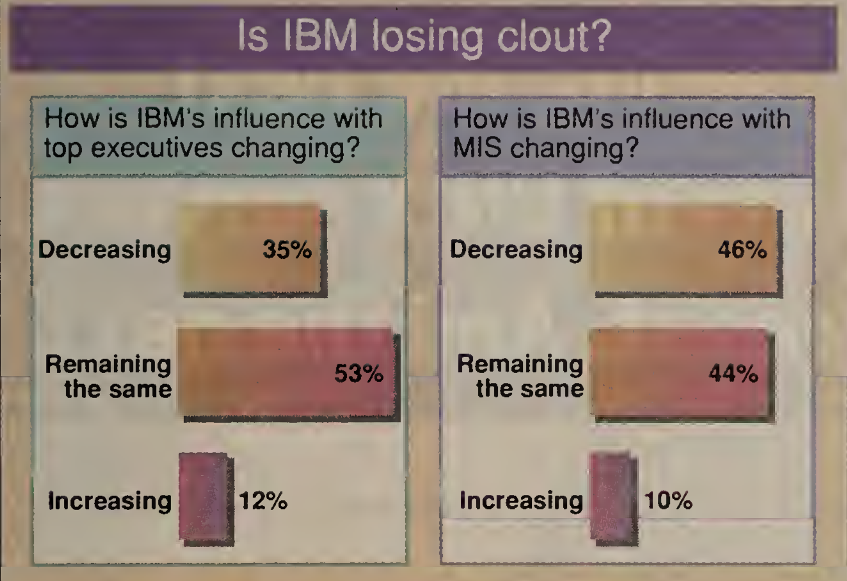
NEC America, Inc.'s Data and Video Communication Systems Division last week announced an enhancement that enables its I5650E and N500A data service unit/channel service units (DSU/CSU) to run at 19.2K bit/sec on a 56K bit/sec line. This enables users to avoid paying carrier upgrade charges should bandwidth requirements increase.

Available now, the I5650E and N500A range from $699 to $1,120. Existing DSU/CSUs can be upgraded for $125.

Adaptive Corp. recently announced it is conducting interoperability testing of its High-Speed Serial Interface (HSSI) implementation with **Cisco Systems, Inc.** and **Computer Technology Corp.** and is working with IBM on an HSSI implementation for IBM's 3172 Interconnect Controller.

HSSI defines a physical-layer data communications interface operating between 1.5 and 50M bit/sec.

Adaptive supports HSSI on its STM/18 SONET Transmission Manager and will test its interface with those on Cisco routers and CNT channel extension products. ◼



Figures are based on a survey of 50 large corporations.

GRAPHIC BY SUSAN J. CHAMPENEY SOURCE: FORRESTER RESEARCH, INC., CAMBRIDGE, MASS.

IBM to trial multimedia network at gigabit speeds

Firm sees SNA handling traffic mix at high speeds.

By Paul Desmond
Senior Editor

TORONTO — IBM will soon embark on a test of multimedia networking at gigabit speeds here using its own PARIS fast packet switches and a fiber-optic network owned by Rogers Cable T.V., Ltd.

The test — along with a similar one IBM announced in January with BellSouth Corp. — is the first step in the evolution toward what IBM envisions will be a new Systems Network Architecture that can handle voice, data, video and image at gigabit/sec speeds.

Both trials are slated to start in the first half of 1992, with the Rogers Cable T.V. trial running for at least a year and the BellSouth test slated for three years.

> PARIS is based on a rack-mounted RISC System/6000 Model 930 with a 6G bit/sec bus.

▲▲▲

"We want to get some early experience with customers with respect to the kind of applications and the kind of use that they can put very high speed networks to," said Bharath Kadaba, senior manager of IBM's Advanced Networking Solutions group.

Rogers Network Services, a division of Rogers Cable T.V., will supply the fiber links for the test over an existing network it employs to provide high-speed services to users in the Toronto area, according to Joe Boutros, director of networks and technology for the company.

"We are trying to test the impact of broadband services on businesses and how they're going to change the way people do business," Boutros said. The company also hopes to determine how to attractively price very high speed switched services, such as for broadcast-quality videoconferencing.

Four IBM PARIS switches will be deployed for the study at locations owned by IBM, Rogers Network Services, cellular phone company Rogers Cantel and Unitel Communications, Inc., a Canadian long-distance carrier, Boutros said.

PARIS is a fast packet switch based on a rack-mounted RISC System/6000 Model 930 with a 6G bit/sec bus, Kadaba said. IBM is developing special adapter cards that work with the bus and provide a link to gigabit/sec fiber-optic lines.

"Currently, we are building a number of these boxes capable of supporting approximately 10M packet/sec per box," he said.

The switch achieves such high throughput rates by embedding packet routing instructions in hardware, obviating the need to run software routines in order to make packet routing decisions.

"There is not a single line of code in the software that's involved in looking at the packet and trying to process it," Kadaba said. "The decision making can be implemented in hardware logic."

Among the applications expected to be tested during the trial are local-area network inter-

(continued on page 21)

User downsizes host applications to LANs

Texas agency moves to client/server setup to cut costs, boost efficiency of claims processing.

By Jim Duffy
Senior Editor

AUSTIN, Texas — The Texas Rehabilitation Commission (TRC) has decided to migrate strategic claims processing applications from company mainframes to distributed LANs supporting a client/server environment in an effort to improve administrative efficiency and cut expenses.

The TRC recently awarded a contract to Applied Information Sciences, Inc. and Unisys Corp. to develop the pilot phase of the Automated Disability Examiner Workstation (ADEW) project, a five-year, $5 million metamorphosis of its proprietary terminal-to-mainframe environment to a distributed, local-area network-based setup.

The move to a purely client/server applications environment is expected to save the TRC $7.5 million over five years in the cost of claims processing. Client/server computing will also free up leased-line bandwidth for other data and reduce the need for some circuits by moving mainframe-based information down to the work-group level.

The ADEW project, which is funded by the Social Security Administration, is intended to reduce administrative and clerical tasks associated with processing insurance disability claims.

The current terminal-to-host technique is "very labor-intensive," said John Ribble, TRC assistant deputy commissioner for information systems. "We're hoping to get away from that. We want to turn our examiners back into examiners and not just paper pushers."

TRC hopes ADEW will free up some 40 employees now performing administrative duties involved in disability determination to function as examiners.

Upon completion, the ADEW network will support over 300 examiners in as many as 130 sites around the state. It will link 576 personal computers and 24 servers on 24 LANs statewide.

The pilot implementation,

(continued on page 20)

Bell Atlantic scales back plans for IntelliManager

By Paul Desmond
Senior Editor

PRINCETON, N.J. — Before it ever got off the ground, Bell Atlantic Corp. has shelved a plan to actively market IntelliManager, its network management product that provides a graphical user interface (GUI) and expert system front end to IBM's NetView.

Although never formally announced, IntelliManager was widely known to be under development, and Bell Atlantic Software Systems had been pitching it to its customers ("BOC offers NetView link," *NW,* April 15).

Now the firm plans to sell the product only as part of a services package and not as an off-the-shelf net management product.

IntelliManager is Unix-based software that runs on an IBM RISC System/6000 and includes an LU 6.2-based link to NetView, said James Donaghy, business development manager for Bell Atlantic, based here. The product can extract alarm data from NetView and apply expert systems technology to help users take corrective action.

IntelliManager's GUI can be employed to help users issue commands to NetView more easily and present NetView data in an easy-to-read format.

The product can also accept alarm data from attached element management systems and provide the conversion required to ship those alarms to NetView, Donaghy said.

In addition, it has a link to IBM's Information/Management that enables users to automatically open trouble tickets in that problem management system from IntelliManager.

Reviewing strategy

When the product was originally being developed two years ago, many of those features were unique.

Now, however, IBM and other net management product vendors have announced similar capabilities, forcing Bell Atlantic to

(continued on page 21)

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Software integrates TCP/IP, token-ring network mgmt.

By Jim Duffy
Senior Editor

CHICAGO — Ameritech Information Systems recently unveiled the Ameritech Network Management Multiprotocol Network Manager, software that consolidates control of TCP/IP and token-ring networks onto a single console.

The Multiprotocol Network Manager is intended to replace separate management systems for monitoring and troubleshooting Transmission Control Protocol/Internet Protocol and token-ring local-area networks, the most prevalent networks in multivendor and IBM sites, respectively.

The software runs under Unix on a 33-MHz Intel Corp. 80486-based platform and sports Open System Foundation, Inc.'s Motif, an X Window System interface and an Informix Software, Inc. SQL database. The Multiprotocol Network Manager requires 32M bytes of main memory and 100M bytes of disk. It includes a graphics library for development of network diagrams and customization of the interface.

Ameritech Information Systems will port the software to Sun Microsystems, Inc. and IBM RISC System/6000 platforms next year, said Dan Clark, director of marketing for the company.

The Multiprotocol Network Manager consists of a graphics subsystem for representing the network, a fault management system for detecting and isolating faults, and a set of management modules for customizing functionality.

The software's fault management system also includes the Navigator, which provides direct access to a net segment without scrolling through multiple screen sequences. When pointing and clicking on a specific node, the Navigator goes directly to that node, instead of pulling up multiple intermediary screens.

Management modules include the Simple Network Management Protocol (SNMP) Manager, the Token Ring Manager and a help-desk module called Call Reporter. The SNMP Manager, which provides access to Management Information Base (MIB) information on managed objects and their attributes, features autodiscovery for automatic identification of new network devices and access to private MIB extensions.

The Token Ring Manager allows the Multiprotocol Network Manager to monitor token-ring LANs by receiving alerts from IBM's NetView management system in IBM's Network Management Vector Transport format and filtering out those specified for token rings. Network diagrams are automatically modified to reflect changes in the condition of token-ring elements, according to Ameritech Information Services.

The Call Reporter allows the network manager to record, update and track end-user trouble reports through help-desk capabilities. The Multiprotocol Network Manager pulls up a historical record of the faulty node for scrutiny of past problem/resolution profiles, allowing administrators to initiate fixes based on previous techniques.

The Multiprotocol Network Manager is expected to be available in November. It is priced between $25,000 and $72,500. ▣

User downsizes applications

continued from page 17

however, which is valued at $400,000, will link two Austin sites that are eight miles apart. At the main headquarters in Austin, Unisys V Series mainframes will serve as repositories for disability claims accounting records. At the Texas State Disability Determination Service claims processing site across town, two Unisys U/6000 Unix-based servers running Novell, Inc. NetWare will house applications for about 44 clients on Ethernet LANs communicating via Transmission Control Protocol/Internet Protocol.

The client/server network is set up in three tiers: The first tier comprises MS-DOS client workstations running disability claims applications and communications software. The second tier consists of Unisys servers with Informix Software, Inc.'s Informix-OnLine relational database management system housing detailed physician and claimant disability records information, plus transaction processing, communications and gateway software. The third tier consists of Unisys mainframes, which store accounting and requisition authorization records, as well as physician and claimant demographics.

The personal computer clients run disability claims applications developed with Unisys' Ally CASE/4GL software. The applications let state examiners determine the eligibility of claimants to Social Security Administration disability status.

Client and server interaction is managed by UniAccess MS-DOS Client on the personal computer and UniAccess Unix Server on the server. As the examiner performs claims processing functions at the personal computer, the application generates data management requests for updates or extracts, which are executed on the Unisys servers or on the mainframe database.

> PC clients run applications developed with Unisys' Ally CASE/4GL software.
>
> ▲▲▲

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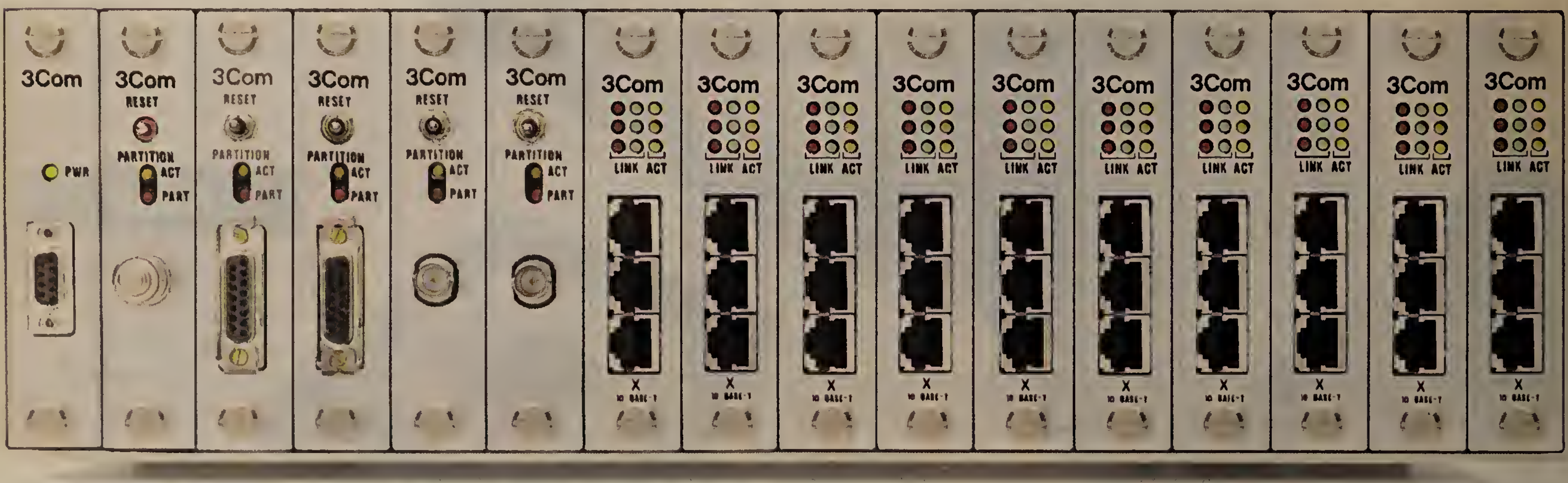

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routes the requests to the server. UniAccess Unix Server receives the request and routes it to another server-based program, Open/OLTP Transaction Manager, which manages client access to the Informix database.

If the data requested resides on the Informix database on the server, the Open/OLTP TM routes the request through a UniAccess SQL server to the database using X/Open Company, Ltd.'s XA protocol for distributed transaction processing. If the request is destined for execution on the mainframe, Open/OLTP TM routes it there through the UniAccess Transaction Gateway.

When the request is complete, the Open/OLTP TM accepts the response and passes it back to the users' personal computer application through UniAccess.

By contrast, in the terminal-to-host environment, examiners have to wait for the mainframe to poll the terminals to determine which devices are ready to request or receive information. Polling takes time and eats bandwidth. Also, administrative and clerical personnel must access, over leased telephone lines, pertinent information from mainframe-based records for examiners preparing medical development letters, Ribble said.

Medical development letters "ran our lines heavy," he said. Sixty percent of the TRC's telecommunications volume was generated by disability determination, he said.

Under the new setup, each server is connected to the hosts at the TRC data center through a leased 9.6K bit/sec circuit multiplexed over a T-1 link.

Over the next few years, the Unisys mainframes will be phased out in favor of high-end Unix-based processors, Ribble said. TRC plans to put out an "open market purchase" for the new processors within the next year and entertain vendor bids.

The rationale for open, client/server computing was to "define the ideal computing environment" for the future, Ribble said. "We felt like it shouldn't be proprietary. We want to allow connectivity to all different systems, with movable software and movable databases.

"We're trying to put computing down where the need is," he continued, summarizing the need for a client/server model. "We'll have mainframes serve as the repositories and move some parts of the applications down where they're necessary."

IBM testing multimedia net

continued from page 17

connection, imaging and applications based on a prototype IBM multimedia workstation.

The prototype workstation, a Personal System/2 running AIX, supports full-motion video delivered to the desktop at 45M bit/sec, as well as audio and image. It also includes an electronic bulletin board, which is a screen that users can employ to show diagrams and that can be marked up for all participants in a conference to view.

IBM hopes to get the video capability of the workstation down to 1M bit/sec in later versions by using compression technologies, Kadaba said.

Besides the four companies lending support to the study, IBM and Rogers Cable T.V. hope to eventually include user companies that will run production applications over the test network, he said.

For IBM, the test will also be an early implementation of a new breed of SNA network that Rick McGee, manager of communication systems architecture at IBM in Raleigh, N.C., has been espousing for months ("IBM modifying SNA," *NW*, Jan. 14).

McGee has said IBM is currently at work on a new routing protocol capable of supporting not only various LAN protocols, the Transmission Control Protocol/Internet Protocol and Open Systems Interconnection data, but also the routing of voice and video packets.

"We have been working with Raleigh and, in particular, Rick McGee on the architecture," Kadaba said. "So you can view the field trials that we are doing as early versions of what McGee talks about."

Carrier scales back on plans

continued from page 17

rethink its IntelliManager strategy.

Donaghy said IntelliManager requires a level of customization that makes it difficult to provide the system as an off-the-shelf product.

"As the software exists today, we will not put it into the general market because of the level of customization required," he explained.

That process includes loading network configuration data from a mainframe, which Donaghy said is difficult because there is no standard way of storing the data so it can be easily extracted. Even users of Information/Management, which includes a configuration database, typically customize that database to meet their own needs.

Not giving up

Bell Atlantic has not given up on the product entirely, Donaghy said, although he acknowledged that no users are currently employing the product.

"We'll use it as a differentiator for customers who have a particular productivity or automation need for the SNA environment," he said.

Although IntelliManager as a whole will never be marketed as a turnkey net management system, Donaghy said the company may sell pieces of it on its own or to third-party vendors.

"It is possible that parts of IntelliManager — such as its expert system capability and interface to NetView — would be made available as products or pieces of a future solution," Dohaghy said.

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LOCAL NETWORKING

PC AND TERMINAL-TO-HOST LANS, GATEWAYS AND MICRO COMMUNICATIONS PRODUCTS

Worth Noting

> "The word 'object' will be the most abused word of the '90s, just as 'open' was in the '80s."

Michael Spindler
President and
chief operating officer
Apple Computer, Inc.
Cupertino, Calif.

Netnotes

Triticom, based in Eden Prairie, Minn., recently rolled out LANdecoder, a tool for managing Novell, Inc. NetWare local-area networks.

LANdecoder captures and decodes actual packet frames traveling across the network as well as the high-level protocol information those frames contain.

The software then displays the information to the network administrator in understandable language via color-coded screens.

The software resides on an Intel Corp. 80286 or higher microprocessor-based node on the NetWare LAN.

LANdecoder provides flexible output options, letting the user save captured data in text files for reporting or in a raw format for feature analysis.

The product is expected to be available Nov. 1 in two versions. The LANdecoder/e for Ethernet LANs will cost $945, and the LANdecoder/tr for token-ring LANs will cost $1,195.

Beyond, Inc. and **CompuServe, Inc.** have announced that the CompuServe Mail Hub for Novell, Inc.'s NetWare Message Handling System (MHS) is now available to BeyondMail customers.

This agreement will let BeyondMail customers send and receive messages electronically using the CompuServe Mail Hub.

The CompuServe Mail Hub currently gives more than 2.5 million NetWare MHS-compatible local-area network and individual workstation users the ability to exchange electronic mail with more than 850,000 CompuServe users throughout the world.

Cogent Windows tool gives PC users wide data access

Product lets users tap into multiple data servers.

By Timothy O'Brien
West Coast Bureau Chief

DALLAS — Cogent Data Technologies, Inc. announced at NetWorld 91 Dallas it will this month begin shipping its Open Windows Connection, a multiprotocol software package that gives personal computer users access to data on a variety of processors in a multivendor network.

The product runs on DOS computers and uses a Microsoft Corp. Windows interface in order to give end users simultaneous access to data on multiple servers in a network.

Open Windows supports access to resources on Novell, Inc. NetWare, Microsoft LAN Manager, IBM LAN Server and Banyan Systems, Inc. VINES networks, using Digital Equipment Corp.'s Local Area Transport, The Wollongong Group, Inc.'s PathWay for Transmission Control Protocol/Internet Protocol, IBM's Network Basic I/O System and Sun Microsystems, Inc.'s Network File System, among other protocols.

"Rather than have the servers provide protocol conversion, we provide octopus-like fingers into the network through multiprotocol support from the desktop," said Charles Anderson, president of Cogent.

The firm based Open Windows on Microsoft's Network Device Interface Specification, which defines how multiple protocol support should be implemented on the client workstation.

Additional access

Cogent is also supporting Novell's competing specification, the Open Data-link Interface, and its LAN Workplace for DOS product, which will give Open Windows an additional option to Wollongong for TCP/IP access.

Analysts said there isn't anything quite like Open Windows yet in the popular Windows desk-

(continued on page 24)

Packard Bell introduces off-the-shelf LAN package

By Caryn Gillooly
Senior Editor

LAS VEGAS — Packard Bell last week brought local-area networks into the retail world with the introduction of a shrink-wrapped network that includes not only the hardware and software to set up a LAN, but also some of the industry's leading application packages.

Introduced at Comdex/Fall here, Packard Bell's Integrated Network System also includes wiring, network installation and maintenance services for a single, fixed price. The package, available through retail computer stores, includes a wiring inspection within 72 hours of the initial order. Installation then follows within two weeks.

Small and midsize businesses or work groups within larger organizations can now have a complete Microsoft Corp. LAN Manager-based 10Base-T Ethernet installed simply by filling out a single order form. That obviates the need to deal with different vendors for various network components, decreases the problems associated with integrating multiple vendor products and eliminates finger pointing when network problems arise.

"We're really offering a complete solution — a single-source LAN that is hassle-free," said Dennis Cox, director or marketing at Packard Bell, based in Chatsworth, Calif. "The user doesn't want to be an integration expert, so we're assuming that responsibility."

The fully configured Integrated Network System includes an upgradable 33-MHz Intel Corp. 80486-based file server with 8M bytes of random-access memory, from three to 25 Intel 80386SX-based workstations, a Packard Bell 10Base-T network hub, laser printer and server-controlled uninterruptible power supply. The server runs Microsoft OS/2 and LAN Manager, with MS-DOS and Microsoft Windows 3.0 on the workstations.

On the application side, the server comes with the Microsoft Word for Windows word processing package, Microsoft Excel spreadsheet for Windows, Precision Software's Superbase 4 database and database management system, DacEasy accounting and payroll software, Lotus Development Corp.'s cc:Mail electronic mail for Windows and Sytron Corp.'s Sytos Plus tape backup

(continued on page 55)

> "We're hoping to tackle 20% of the problems that will satisfy 80% of users' needs."

Elaine Bond
☐ President and chairwoman, Open User Recommended Solutions board of directors
☐ Senior vice-president and chief technology officer, The Chase Manhattan Bank, N.A.

OURS set to tackle multivendor issues

User group officially forms, sets goal of helping vendors meet needs of multivendor net users.

By Caryn Gillooly
Senior Editor

DALLAS — The Open User Recommended Solutions (OURS) user group, announced in June, recently ratified its charter to help vendors understand and meet the needs of users implementing multivendor nets.

OURS is a multivendor user group that was spearheaded by Novell, Inc. President Raymond Noorda. With the official formation of the group, announced here at NetWorld 91 Dallas, users of multivendor networks will now be able to speak with a unified voice about the issues they face in building and operating those nets.

Some of the problems the group intends to address are software licensing, security and network access issues. For each of these topics — and others the group will discuss — OURS will issue a white paper to vendor members specifying exactly what they need to do to meet user needs.

"Vendors do not understand what our priorities are across different vendor platforms," said Elaine Bond, who was elected president and chairwoman of the OURS board of directors. Bond, senior vice-president and chief technology officer at The Chase Manhattan Bank, N.A. in New York, said most suppliers are accustomed to dealing only with single-vendor issues.

Mission statement

The stated mission in the group's charter is "to promote interoperability of vendor products so that they may be easily integrated, managed and maintained in users' computing environments in support of their organization's objectives."

In conjunction with the group's formation and official election of board members, Bond gave some specifics about the types of problems the group will initially be targeting.

For example, users want all vendors to adhere to a common licensing methodology. "Users have to deal with different licensing agreements for virtually every piece of software installed on the network," Bond said.

The group plans to deliver to vendors within the next several months a white paper specifying how vendors could implement a common licensing structure.

Password simplification

OURS members discussed the need for a single system sign-on, where an end user would have one identification and one password that would only have to be entered once, regardless of how many systems that user accesses.

"Now every time you go through a barrier, you have to enter a new password," Bond explained.

The group is discussing virus and security issues as well. OURS is currently trying to decide whether antivirus programs should be included in vendors' products, as opposed to being separate products as they are today.

OURS will also deal with topics such as disaster recovery and risk management. In addition, the group plans to let vendors know if they are lagging in implementing key technologies, such as X.400.

According to Bond, OURS will not try to do the work of the stan-

(continued on page 24)

OURS set to tackle issues

continued from page 23

dards bodies and will differentiate itself from single-vendor user groups.

"We believe strongly in the work of the standards bodies, but we are not standards developers," she said.

The focus of OURS is to achieve short-term results based on practical, operational requirements. The group will look specifically at the problems users have connecting networks from different vendors.

"Users involved, as well as those not involved, will benefit from the flow of information" between the group and vendors, Bond said. "And vendors will benefit. If they can make life easier for us, more money will be spent on growth rather than on coping with exising systems."

The group's current membership includes about 20 major corporations and groups from around the world, representing more than 150,000 end users.

In addition to the 20 user organizations, more than 20 vendors have expressed interest in joining — about 15 of which are on the verge of committing — although their names have not been released.

Bond stressed, however, that all users and vendors should get involved, regardless of their size. "We want to represent as large a set of the user community as possible," she said. "Small companies will have different problems than larger companies, but all requirements will be heard.

"We know we cannot be all things to all people, so our goal is to find common threads" that can meet the majority of user needs, she said.

For more information on OURS, call 800 237-6877. ◪

Cogent tool gives wide data access

continued from page 23

top environment.

"Right now, they are the only vendor that can provide support through Windows of all the major networks and protocols," said Doug Allinger, research analyst at the Clarke Burton Corp., a consultancy in Salt Like City. "It definitely fills a need in multivendor networks."

Cogent has developed several new underlying technologies to provide the capabilities found in Open Windows.

The first of these is the Hot Protocol Architecture, which permits all protocols to be loaded and maintained in high memory simultaneously in DOS and Windows environments. That is in contrast to demand protocol architectures that require a user to load and unload a protocol every time a new device connection is required.

Another new technology, Dynamic Desktop Routing (DDR), enables automatic and transparent selection of the appropriate protocol so users do not need to know how another device is being accessed. DDR makes different host servers appear to DOS and Windows applications as if they are local.

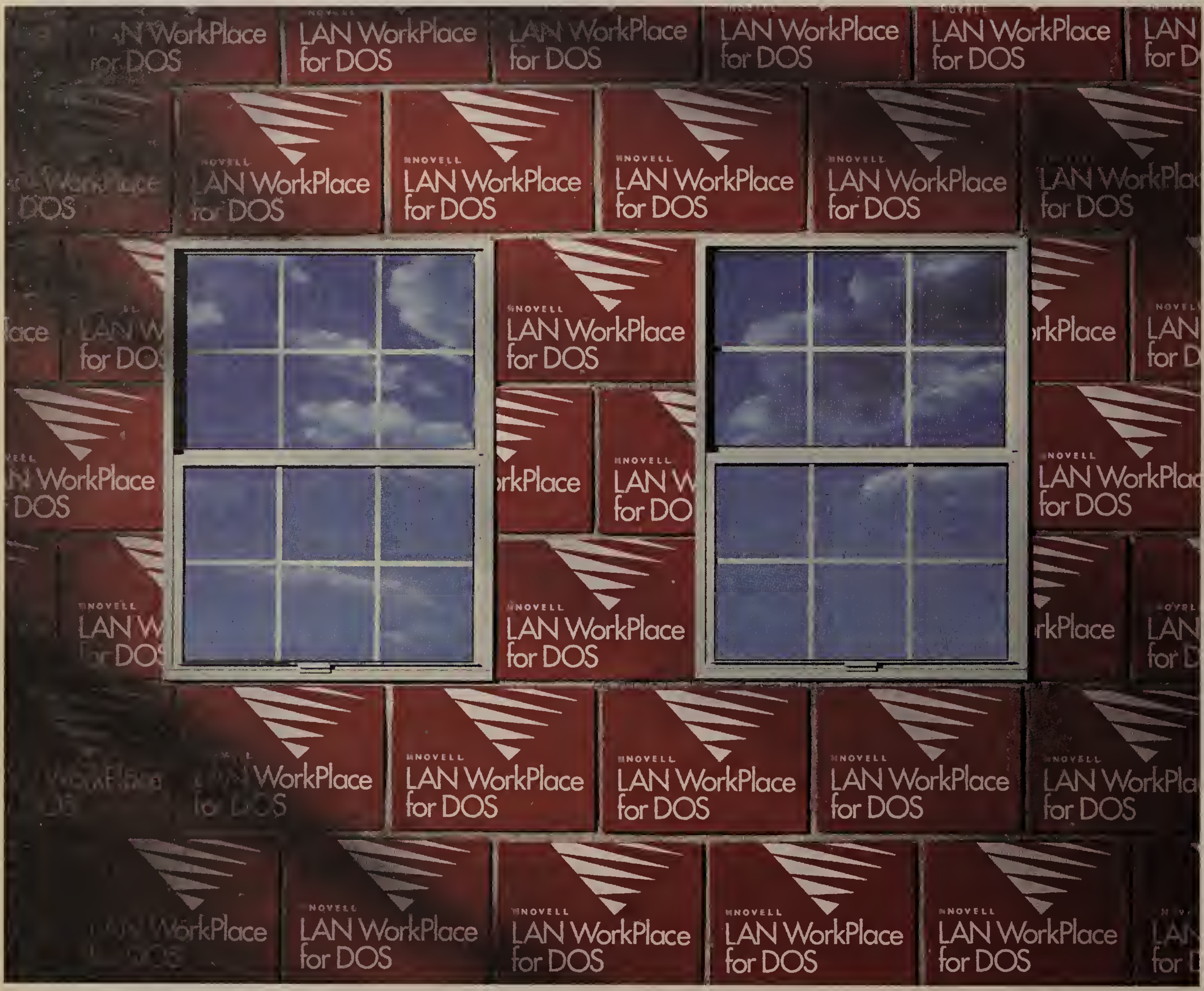
The product detects the network destination of the packet, matches the packet to the appropriate memory resident protocol and sends the packet on its course using the appropriate local-area network adapter or connection.

Allinger pointed out that Cogent is treading on Microsoft's turf. Cogent's product gives Windows users access to other resources using existing character-based interfaces. He said a future version of Windows will provide a common interface to all nets.

However, that functionality is not expected for at least a year. In the meantime, Cogent is talking to major LAN players about how Open Windows can extend network interoperability.

Open Windows is sold on a workstation basis at $129 per desktop. A 10-user pack costs $109 per user, while a 100-user pack cost $89 per user. Further volume discounts are available. Current media types supported are Ethernet 802.3 and Token Ring 802.5.

Cogent is located in Friday Harbor, Wash., and can be reached at (206) 378-2929. ◪



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MANAGEMENT STRATEGIES

MANAGING PEOPLE AND TECHNOLOGY: USER GROUPS AND ASSOCIATIONS

Dialogue

Will support for the Open Software Foundation, Inc.'s (OSF) recently announced Distributed Management Environment (DME) figure into your purchase plans for network and systems management products in the near future?

"No, the OSF decision won't impact us in any meaningful way for a while. I compare it to ISDN. People asked as long as 10 years ago how ISDN would affect them. And users were thinking, what does ISDN-compatible mean? It's only now starting to mean something to users."

Thomas Festa
Communications director
Liberty Brokerage, Inc.
New York

"It's too early to tell. But the group's DME tends [to be] toward open systems and an interoperable approach among multiple vendor systems, so the selection is something I'm interested in looking at further. There have been so many times when promises have not measured up, so I'm going to take a wait-and-see attitude."

Phillip Evans
Director of telecommunications
FMC Corp.
Dallas

"No, because the length of time it'll take the OSF to procure the pieces and meld them together to produce a licensable set of source code for the DME is indeterminable.

"Additionally, there's no guarantee that the resulting products will meet the necessary criteria for interoperability."

Laurie Bride
Manager of communications technology
Boeing Computer Services Co.
Seattle

"It sounds really good. It's important to understand where they're going. If DME and OSF/1 are successful, it gives me hardware independence. We'll do whatever we can to make it work in the marketplace because it's to our advantage."

John Payne
Communications architect of information services
DHL Worldwide Express
Redwood City, Calif.

Pending House legislation would up software costs

Extended write-off period would cause problems.

By Wayne Eckerson
Senior Editor

WASHINGTON, D.C. — Network managers could end up paying significantly more for software if a tax simplification bill introduced in the House of Representatives becomes law.

Tax bill H.R. 3035, which was introduced by Dan Rostenkowski (D-Ill.), chairman of the House Ways and Means Committee, seeks to apply a blanket 14-year amortization period to hundreds of intangible assets, including software and such items as recipes, customer lists and unpatented know-how. If passed, the legislation would resolve hundreds of Internal Revenue Service audits, valued at $262 billion, involving disputes over the taxation of intangible assets.

"The 14-year amortization period will mean that businesses that acquire software will still be writing off the acquisition costs long after they have stopped using the software due to technological obsolescence," said Richard Crandall, president and chief executive officer at Comshare, Inc., during testimony before the House Ways and Means Committee last month.

Crandall said the useful life of most software is between one and five years. He estimated that a 14-year write-off would increase the effective cost of purchased software between 12% and 20%.

Software costs would rise because it would take firms longer to accrue the money that comes from deducting the cost of software from taxes. The legislation might also keep firms from purchasing new software until existing software is written off.

During an initial hearing last month on the bill, representatives from the software industry strenuously objected to classifying software as an intangible asset and claimed that the legislation would increase the after-tax cost of purchasing software, impede the development of new technologies and undermine the competitiveness of the U.S. software industry.

As written, the bill refers to software generically and doesn't make distinctions between off-the-shelf, leased and licensed software, or software acquired during the purchase of a company and software bundled with hardware.

Kenneth Gideon, assistant secretary for tax policy at the Department of the Treasury, suggested at the hearing that an exception to the legislation might be made for off-the-shelf software, which would be amortized in five years. By implication, all

(continued on page 55)

EXECUTIVE BRIEFS

BY WAYNE ECKERSON

The quality bug bites the U.S. American industry is transforming the way it does business in order to embrace quality principles, according to a recent study on quality practices in Canada, Germany, Japan and the U.S.

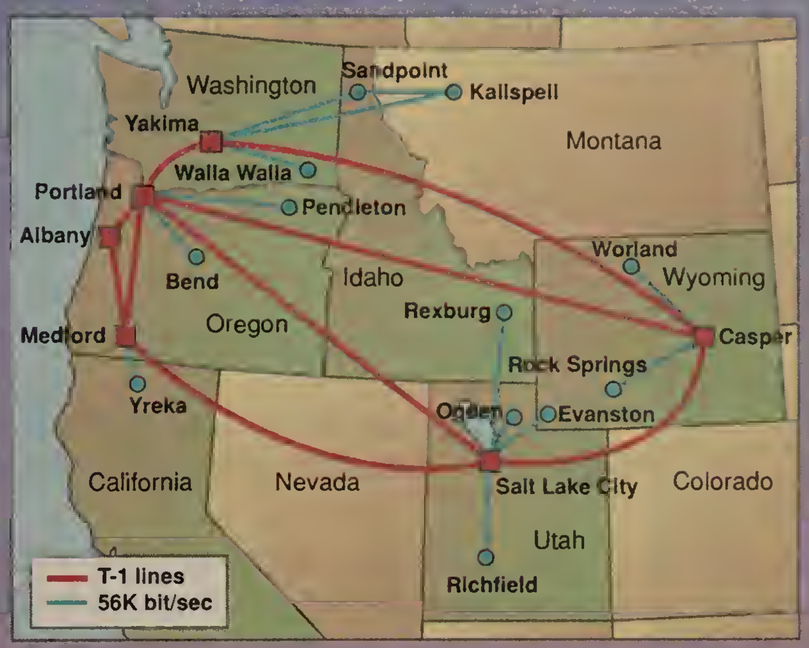
The study shows that, over the next three years, 75% or more employees will serve on quality-related teams at about one-third of U.S. companies. Currently, only 25% or less in two-thirds of Japanese firms are in such teams. Moreover, U.S. businesses are quickly embracing the use of quality performance as a basis for executive compensation.

The report also discusses the use of technology to meet customer expectations, the role of customer satisfaction in strategic planning, the incorporation of customer expectations into the design of new products or services, the use of cycle time analysis and process simplification as well as employee involvement in quality issues.

The study was cosponsored by Ernst & Young, a Vienna, Va.-based consulting firm, and the American Quality Foundation, an independent nonprofit organization formed to address public and economic issues in quality and productivity. The survey is based on data collected from 500 companies.

For copies of the study, call Steve Yearout at (216) 861-5000 or Richard Sasanow at (212) 773-6179. ◻

PacifiCorp's multiprotocol backbone



PacifiCorp uses Advanced Computer Communications bridge/routers to support LAN internetworking over a T-1 network.

GRAPHIC BY SUSAN J. CHAMPENEY SOURCE: PACIFICORP ELECTRIC OPERATIONS, PORTLAND

PacifiCorp strives for 'any-to-any' net

Utility company constructs multiprotocol net to support LAN traffic and pave the way for OSI.

By Maureen Molloy
Staff Writer

PORTLAND, Ore. — PacifiCorp Electric Operations is in the midst of a major network upgrade designed to provide "any-to-any" device connectivity for users of more than 8,000 personal computers, workstations and terminals in over 100 locations in the Northwest.

The company's ultimate goal, according to Art King, PacifiCorp's senior operating systems specialist, is to establish an Open Systems Interconnection network environment that will enable any user on the net to access any of the company's computing resources. Constructing a multiprotocol internetwork is a key step to achieving that end, he said.

"Our goal is any-to-any connectivity," King said. "We intend to move fully to OSI as quickly as possible and remove ourselves from being held hostage to any proprietary system."

The migration to open systems is an especially formidable task for the utility provider since the company's network platform began as a pure IBM Systems Network Architecture environment.

In the original SNA network, terminals in remote sites accessed data on IBM mainframes via point-to-point lines. With IBM raising software and hardware maintenance prices about 12% each year, King said it was becoming increasingly difficult to maintain the network.

With the multiprotocol internetwork, PacifiCorp expects to prune network costs as it promotes greater productivity among end users.

The company has established six concentrator sites linked together in a mesh T-1 network. The sites house StrataCom, Inc. fast packet switches and Advanced Computer Communications (ACC) Series 4000 multiprotocol bridge/routers that together support voice, data and video communications.

Local-area networks at smaller sites are tied into the closest major node through an ACC router and 56K bit/sec lines. The multiprotocol bridge/routers support Transmission Control Protocol/Internet Protocol, Digital Equipment Corp. DECnet and Apple Computer, Inc. AppleTalk traffic.

King said TCP/IP, DECnet and

(continued on page 55)

> "We intend to move fully to OSI as quickly as possible and remove ourselves from being held hostage to any proprietary system."

▲▲▲

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ความมีประสิทธิภาพต่อเนื่องกันที่จะได้จากโครงสร้างทางการสื่อสารคมนาคมในภาคพื้นเอเชียแปซิฟิคนั้น ขึ้นอยู่กับการตัดสินใจเลือกผู้ที่จะทำหน้าที่สื่อสารให้

ท่านต้องการมากกว่าการนำหน้าทางเทคโนโลยี่อันตรงตามเป้าหมาย ท่านต้องการบริษัทที่มีทรัพยากรที่จะช่วยสนับสนุนท่านต่อเนื่องกันไป หลังจากที่บรรลุผลทางเทคโนโลยี่แล้ว

ซึ่งก็หมายความว่าท่านต้องการบริษัทสื่อสารที่ช่วยแนะแนวทางแก้ปัญหาต่างๆ เช่นกำหนดกฎเกณฑ์ของรัฐบาล ปัญหาตรวจคนเข้าเมือง ที่อยู่อาศัย ตลอดจนการศึกษา

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GLOBAL NETWORKS

USER STRATEGIES, INTERNATIONAL SERVICES & REGULATION

World News

TeleColumbus AG, the Swiss parent of international carrier World Communications, Inc. (WorldCom), last week announced the acquisition of **Houston International Teleport (HIT),** a satellite and video service provider.

TeleColumbus also announced that David Olson, HIT's founder and chief executive officer, has succeeded Rosario Romanelli as WorldCom's chief executive officer. Romanelli is now vice-chairman of TeleColumbus USA, Inc., the parent's U.S. subsidiary. By leading both WorldCom and HIT, Olson will be able to more closely coordinate the activities of the two firms, a company official said.

For example, one of HIT's units, Satellite Transmission and Reception Specialist Co., operates an international satellite earth station in Houston that television broadcasters use for video transmissions. WorldCom will now have access to that earth station for network service to Mexico and South America. HIT will also use WorldCom's international facilities to increase its international video transmission business.

Swedish Telecom and **PTT Telecom Netherlands** recently said they plan to form a new company, called Unicom, that will bid to operate users' global private networks. The new firm plans to offer services via a network spanning 10 European countries by 1992 and seek other carriers as partners.

Poland turns to U.S. for help with network upgrade

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — A delegation of 15 network planners from Poland visited U.S. officials here recently, seeking aid from American firms and agencies to help with the enormous task of transforming an antiquated electromechanical network into a modern digital facility.

According to the delegation, one of the most pressing problems facing Poland is a drastic lack of telecommunications facilities. Poland has a population of 38 million but only three million telephone lines.

Within the next 10 years, the country hopes to have 30 million lines and a fully digital network capable of supporting services such as Integrated Services Digital Network.

Marian Dabrowski, head of the delegation and advisor to the Polish Ministry of Telecommunications, said the country must start from scratch on almost every front. It needs new switches, customer premises equipment, transmission facilities, billing systems and engineers.

In addition, Polish officials are trying to hammer out new policies on regulation, rates and competition for the telecommunications industry. But the country has little experience to draw on since it traditionally has had centrally controlled, government-owned network facilities. Poland, therefore, has turned to the U.S. for guidance.

Dabrowski and his colleagues spoke at a conference cosponsored by the U.S. Trade and Development Program, an independent agency within the U.S. International Development Cooperation Agency, and Teleconsult, a consulting firm based here.

According to Dabrowski, the initial focus in Poland will be on business customers. "There is a big demand for residential services, but because of the lack of money, our first priority is for business," he said.

Polish officials are planning to implement a tandem network with 42 switches initially, according to Andrzej Zejdel, an official with the Polish Telecommunications Institute of Standards. It has not yet been determined which vendors will be chosen for the project, he said.

Deployment of new network facilities will start in metropolitan areas, such as Warsaw, where a tenth of Polish businesses are located, and then move out into more rural areas, Dabrowski said.

First things first

Initially, Polish officials are concentrating on bolstering the network to provide voice service because there is such a gap between supply and demand. But as the country begins to install new digital facilities, it will look toward other services, such as a packet-switching network for Polish banks, electronic mail and ISDN.

AT&T will participate in a pilot ISDN service in Warsaw at the end of the year, using one of its international 5ESS gateway switches, Dabrowski said.

Currently, the country's network is built on electromechanical switches, uses manual billing systems and is almost entirely owned by the government's Ministry of Post and Telegraph. However, the country adopted a new communications law in January that will allow the gradual introduction of private and foreign ownership of network facilities, he said.

Andrzej Ksiezny, an official

(continued on page 38)

"You can use [outsourcing] to overcome the difficult job of dealing with individual PTTs in different countries and coping with different national standards."

▲ ▲ ▲

Nick White
☐ Head of worldwide telecommunications, Unilever PLC
☐ Chairman, Telecommunications Managers Association

Unilever exec talks global outsourcing

Worldwide telecom chief discusses company's decision to hand over its network to US Sprint.

Q&A One of the hottest trends to sweep the international network industry in recent months is outsourcing, or the provision by a single carrier of all a user's international services.

Service providers such as AT&T, British Telecommunications PLC (BT), Infonet Services Corp., MCI Communications Corp., and Nippon Telegraph and Telephone Corp. have either launched new international network outsourcing services or, at the very least, acknowledged growing user demand for such services.

One of the most widely publicized international net outsourcing contracts was signed last summer by Unilever PLC, a $40 billion consumer products giant based in London, which contracted the Sprint International division of US Sprint Communications Co. to manage all of its data network resources in Europe ("Unilever signs with Sprint Int'l for IVAN data services," *NW,* Aug. 5).

In order to shed further light on why a large company such as Unilever would outsource an international network, *Network World* Senior Editor Barton Crockett spoke with Nick White, Unilever's head of worldwide telecommunications and chairman of the Telecommunications Managers Association, a leading U.K. user group.

What would be the principal advice you would give to a U.S. network manager grappling with the project of building a network in Europe?

I think the first point to remember is you're dealing with a number of different countries. And the services that are available and what you can do will vary from country to country.

This means it's difficult to build a network on your own. For this reason, I think there is a general trend toward buying managed network services from major operators.

(continued on page 28)

What it takes to be the international specialist. #4 in a series.

"Hometown Advantage."

—*Stephan Folgnand*
Managing Director,
Germany
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If you were touring throughout Germany, who would you choose to show you around—a tourist or the local tour guide?

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Germany hedges on breaking up telecom market

IDG News Service
European Bureau

PARIS — Germany will oppose efforts to abolish public switched telephone service monopolies throughout the European Economic Community (EEC) when those proposals come under review next year, according to a high-ranking German telecommunications official.

Christian Schwarz-Schilling, Germany's minister of posts and telecommunications, recently said he does not want to subject Germany's monopoly provider of public switched telephone services, Deutsche Bundespost (DBP) Telekom, to heightened competition at the same time it is modernizing the infrastructure of former East Germany. Consequently, Germany's position makes greater liberalization of network regulations in the EEC unlikely.

The Commission of the European Communities (CEC) is expected to support the dissolution of public switched telephone monopolies next year when it outlines its strategy for Common Market network reforms after 1992. But without German support, there is little chance the CEC can convince EEC member countries to vote in favor of public switched net competition.

Currently, public switched telephone services account for about 90% of European carrier network service revenues. Public switched telephone services are supplied by monopoly carriers in every Common Market country except the U.K.

If the CEC is unable to convince EEC member countries to support a measure to end public switched telephone monopolies, it could be forced to mandate this reform over the member countries' objections. The CEC could do this by using antimonopoly provisions in the Treaty of Rome, which is the founding document of the EEC. It contains provisions that effectively require member countries to end monopolies deemed not in the public interest. In 1988 and 1989, the CEC used these antimonopoly provisions to force Common Market countries to end monopolies in the supply of customer premises equipment and the provision of value-added services.

But some Common Market countries objected to this approach and filed a protest with the EEC's Court of Justice, which eventually ruled in the CEC's favor. But any move by the CEC to use the Treaty of Rome's antimonopoly provisions to end public switched telephone service monopolies is expected to face stiff opposition from many Common Market countries.

Strain of unification

Schwarz-Schilling added that he would like to privatize DBP Telekom within two years.

He also said he opposes plans by Germany's railway authority to set up a pan-European network with other European railway companies that could be used to provide network services in competition with Europe's monopoly carriers. The railway consortium is called the Hermes Community. But Schwarz-Schilling did not rule out the possibility that he might support greater competition in Germany's network markets later in the decade.

Many senior officials in Germany believe DBP Telekom's monopoly will eventually end. For example, Gerd Tenzer, one of the carrier's leading strategists, said that technological and political pressure, the latter coming largely from the CEC, will soon make DBP Telekom's monopolies a thing of the past.

Schwartz-Schilling's support for privatization of the state-owned DBP Telekom is significant but does not necessarily mean that it will happen. Under German law, public switched telephone services must be provided by the state. Changing this requires a two-thirds majority vote in Germany's parliament.

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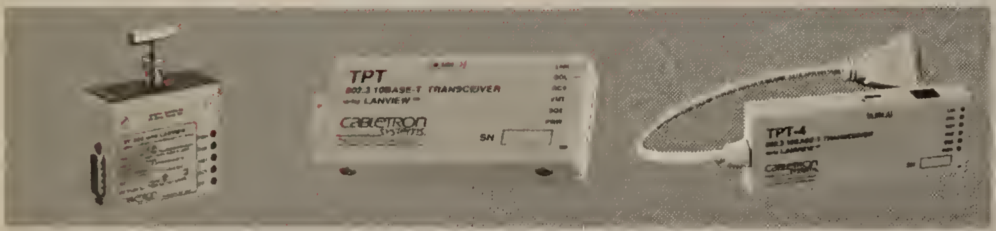

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Unilever exec talks global outsourcing

continued from page 27

How, exactly, do you define managed network services?

The dynamic management of bandwidth for a number of applications. This includes the operational management of the network [for the user, with the service provider handling] management of things like routing tables and switches, gateways to other networks, capacity planning, operational fault management, obtaining local tail circuits from PTTs and network installations.

You can use this to overcome the difficult job of dealing with individual PTTs in different countries and coping with different national standards.

Has the regulatory environment in Europe evolved to the point where a single vendor can legally supply these services in competition with monopoly post, telegraph and telephone administrations?

Yes, although I believe it will require some degree of negotiation between the operator [providing managed network services and the PTT].

Who are the leading European providers of managed network services?

AT&T, US Sprint and Infonet, in addition to BT, are, in our view, the ones who are furthest along with the management infrastructure, organization and technical infrastructure needed to provide [pan-European, managed network] services.

But it's still early for all the [managed network service providers] — particularly in terms of [private-line] services. This is because most of the managed network service providers only have an X.25 network — if they have any network at all. And the demand and the applications are such now that X.25 is not sufficient to meet people's needs.

Why did Unilever choose managed network services instead of building a network itself?

Unilever has, for a number of years, pursued what is now referred to as an outsourcing approach.

For example, in the early '80s, the U.K. headquarters sold its in-house computing and network to [Electronic Data Systems Corp.]. So [obtaining managed network services] makes sense to us from a philosophical standpoint.

It also makes sense from a practical standpoint. Unilever has some 500 independent companies and is buying and selling a company once every week or two. It's almost impossible for us to predict loading. Traffic is extremely irregular or peaky.

The prospect of building an in-house private network, especially when we're losing switch sites every 10 days, is really not practical.

We believe that contractually, managed network services are cheaper for us. Using managed network services lets us avoid capital investment in new technology [for a private network].

These reasons are in addition to all the normal reasons for outsourcing — such as sticking to the core business and not being able to find qualified employees.

How did the company go through the process of selecting a vendor?

To choose our managed network service provider, we started in the broadest possible way.

We first found out who would be interested in serving us, starting with our computer suppliers, IBM and [Digital Equipment Corp.]. We also talked to our network service providers, principally the carriers in the major countries where we operate, including BT, PTT Telecom [the Netherlands' dominant carrier] and the three major American carriers, AT&T, MCI and US Sprint.

We also talked to anybody else we felt offered networking services, including EDS, Infonet and GE [Information Services].

The serious discussions came down to four suppliers; AT&T, US Sprint and BT, plus Infonet with a partner, either Infonet's major equity holder, MCI, or DEC. Then we eliminated BT and Infonet. The reason we eliminated BT was that they were unable to propose Syncordia [a company BT launched in September to provide global private networks to multinational users].

If BT had proposed Syncordia, would they have fared better?

I can't say whether they would have because I don't know what they would have proposed and what the prices would have been. But we felt that the offerings of AT&T and US Sprint gave us the best choice.

We spent a couple of months with AT&T and US Sprint, in effect preparing draft contracts with pricing and looking at their technical and management capabilities. We were left with the fortunate situation, in our view, that we couldn't lose because we believed that both companies could meet our requirements.

In the end, I guess the only differentiator came down to who had the best infrastructure. And the presence of SprintNet [in Europe] gave US Sprint a significant advantage over AT&T, which committed to build a [pan-European] network it did not have at that stage. But we felt that AT&T could have done the job.

So AT&T would have provided Unilever with services from its own pan-European network?

Well, the local tail circuits to access AT&T's network obviously would have been provided by the local PTTs. But the international services would have been based on bandwidth that AT&T would have owned and operated and might ultimately have shared with other customers.

There's been a lot of speculation about when Europe will have full competition between facilities-based carriers. Do you think this will come to Europe? If so, when?

I would say that in data networking, by 1995 or 1996, someone providing pan-European services [in competition with PTTs] shouldn't have too many restrictions.

But the investment required to compete with the PTTs suggests there will only be a few players who are successful. So perhaps one should look for a minimum of three real data network service competitors in each country and perhaps four or five operating on a pan-European basis.

On voice, I think there will be some countries that will, like the U.K., liberalize and allow competition, and this will also occur by 1995 or 1996.

PRODUCTS & SERVICES

THE LATEST OFFERINGS FROM VENDORS AND CARRIERS

First Look

Cabletron releases low-end Ethernet hubs

Cabletron Systems, Inc. recently announced a nine-port Ethernet 10Base-T hub that, at $77 per connection, is said to be one of the least expensive per-port hubs available today.

The stand-alone **MR9T** unit is a feeder hub that lets small work groups access a primary backbone hub via a single 10Base-T connection.

The wall-mountable MR9T can support up to eight devices and an uplink to Cabletron's Multi Media Access Center hub. The device essentially provides an easier, more affordable way to tie small work groups to corporate nets.

The MR9T has a series of LEDs that provide administrators with diagnostic capabilities for detecting net status.

The MR9T is compliant with IEEE 802.3 repeater functions. It costs $695 and is expected to ship by year end.

Cabletron Systems, Inc., 36 Industrial Way, Rochester, N.H. 03867; (603) 332-9400.

ALR unveils fault-tolerant personal computer server

Advanced Logic Research recently unveiled a fault-tolerant personal computer-based server for small and midsize work groups.

The **ALR Powerpro/FT** is a floor-standing multiprocessor server based on 50-MHz Intel Corp. i486DX microprocessors and an Extended Industry Standard Architecture (EISA) bus.

The server supports DOS, OS/2 and The Santa Cruz Operation, Inc.'s SCO Unix, as well as Novell, Inc.'s NetWare and Banyan Systems, Inc.'s VINES. It can handle as many as 30 concurrent users and offers 40 million instructions per second.

The ALR Powerpro/FT has 5M bytes of random-access memory, nine internal drives, eight EISA expansion slots, two ISA expansion slots and two proprietary expansion slots. Available now, the server is priced between $5,695 and $9,795.

Advanced Logic Research, 9401 Jeronimo Road, Irvine, Calif. 92718; (714) 581-6770. ◘

DEC beefs up InfoServer net storage

By Joanne Cummings
Staff Writer

MAYNARD, Mass. — Digital Equipment Corp. recently unveiled a more powerful version of its InfoServer network storage subsystem that enables Ethernet users to archive and retrieve data located on as many as 14 different storage units.

DEC also said it has extended the InfoServer 150 to support DOS workstations attached to Novell, Inc. NetWare local-area networks. Until now, the device only supported users attached to a VMS host on a DEC DECnet.

Targeted at users that generate large data volumes — such as those using library automation, hospital networks and pharmaceutical databases — the InfoServer 150 provides access to centralized information faster than traditional network file servers, according to a DEC spokeswoman.

The device — a rack enclosure holding up to 14 multiple data media devices ranging from traditional hard disk drives to optical drives and CDROMs — responds to data requests by forwarding data in a file format-independent, block-level protocol. This is more efficient than the file length formats used by traditional file servers and provides support for different file formats, according to the spokeswoman.

The InfoServer 100 supports only nine data storage devices, such as hard disks, optical drives and CDROM drives.

The InfoServer 150, which will eventually replace the InfoServer 100, adds support for magnetic and digital audio tape drives.

InfoServer 150 includes Version 2.0 of DEC's InfoServer software, which enables VMS, MS-DOS- and NetWare-based person-

(continued on page 38)

New UconX server extends reach of Ethernet nets

By Joanne Cummings
Staff Writer

SAN DIEGO — UconX Corp. recently unveiled a communications server that links workstations on Ethernet local-area networks to a variety of remote systems via public and private services.

UconX said its Communique communications server is highly scalable in terms of performance and can be easily customized to meet special connectivity needs.

The stand-alone device enables users on a single Ethernet net to access wide-area networks such as private data nets, public X.25 packet-switched networks, financial market feeds and the Military Network, which is used by military researchers to send routine communications.

The Communique unit is based on a VMEbus architecture and uses a master Motorola, Inc. 68000 CPU card with an Ethernet interface. It contains between two and 20 controller cards, each with multiple high-speed serial ports for connecting to WAN services ranging in speed from 300 to 1.5M bit/sec T-1 speeds. These serial ports let Communique access both public and private network services.

Communique is scalable in that users can upgrade the CPU processing power by installing a Motorola 68020- or 68040-based card. Users may also vary the number and type of controller cards to support a few serial lines or as many as 128.

The product supports X.25, High-Level Data Link Control/Synchronous Data Link Control, Binary Synchronous Communications and asynchronous protocols.

Communique can also support custom protocols through the use of UconX's Streams-based protocol development package, called ProtoKit. UconX's Streams, based on AT&T's Unix System V, provides a standard programming interface that enables users to build their own protocol stacks.

A company spokesman said user-developed protocols can coexist on the same server with standard protocols, but recommended that no more than four protocols be used at a time.

UconX also offers versions of Communique for token-ring, Fiber Distributed Data Interface and Small Computer System Interface platforms.

Configured with one 68020 CPU board and two controller boards, Communique is priced at $10,000 and is available now. Protokit costs $5,000 and is also available now.

For more information, contact UconX at 6540 Lusk Blvd. C-113, San Diego, Calif. 92121, or call (619) 546-9232. ◘

New SunConnect unit airs first products

Offerings include latest SunNet Manager version, SNMP agents for SPARCsystems, FDDI adapters.

By Paul Desmond
Senior Editor

MOUNTAIN VIEW, Calif. — Sun Microsystems, Inc. recently launched its SunConnect unit along with new and enhanced products that address Simple Network Management Protocol (SNMP) network management, Fiber Distributed Data Interface nets and wide-area communications.

SunConnect has been operating as a separate business unit since March but was officially unveiled earlier this month as the Sun unit charged with integrating Unix offerings into other computing environments and providing tools to manage heterogeneous networks.

As part of its first product launch, SunConnect introduced Version 1.2 of SunNet Manager, its Unix-based multivendor distributed net management system.

Key among the new features in Version 1.2 is a new application program interface (API) to the SunNet Manager database, said Denis Yaro, director of network management for SunConnect. The new API lets other vendors write applications that enable their devices to be automatically discovered and entered into configuration tables by SunNet Manager.

"Previously, the automated topology feature was nonexistent or specific to certain protocols and sets of devices," such as Sun equipment, he said.

SunNet Manager supports a number of net management protocols via proxy agents written to an existing API.

To expand the product's management capabilities, the company also announced the SunConnect Partners Program for Network Management, which offers marketing and development support for third-party distributors, application developers, system integrators and porting partners. Thirty-five partners have already signed on under the program, SunConnect said.

The company announced its first SNMP agents for Sun SPARCsystem workstations and servers. The agents enable machines running SunOS 4.0 or higher to be managed by any SNMP manager, including SunNet Manager. Users can copy and distribute agents at no charge.

The SNMP agent supports such functions as monitoring CPU utilization, and determining how long a machine has been running and how much bandwidth it is utilizing, Yaro said. It can also shut down a remote workstation in order to abort an application with an error condition.

The product represents a first step toward managing software on a workstation or server. "This is an area where there hasn't been any effort in the Unix world," he said.

Yaro pledged SunNet Manager would also support the Open Software Foundation, Inc.'s Distributed Management Environment if users demand it.

"We have no protocol agenda," he said. "We're driven totally by our users."

> Key among the new features in Version 1.2 is a new application program interface to the SunNet Manager database, Yaro said.
>
> ▲▲▲

SunNet Manager Version 1.2 software is available now and costs $3,000.

SunConnect also introduced a new FDDI adapter card, the FDDI/S, that supports single-attach FDDI network connections for SBus-based systems, including SPARCsystem workstations and servers.

"The gist of this is taking FDDI down to the desktop," said Laura Lilyquist, business development manager at SunConnect.

Priced at $2,995, the product is intended to lower the cost for attaching a workstation to an FDDI network. By comparison, the company's FDDI/DX product, a dual-attach interface for VME-based computers, costs $12,500.

Lilyquist said the FDDI/S represents a step toward support for FDDI within the motherboard of an SBus computer, meaning the machine could connect directly to an FDDI network without an adapter.

(continued on page 55)

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OPINIONS

TELECOMMUNICATIONS EQUIPMENT

BY EDWARD HORRELL

Users can benefit from revitalized secondary market

Telecommunications users are missing out on opportunities that those in the computer industry have been enjoying for a long time — the opportunities that come with a fully supported market for second-hand equipment.

In 1984, AT&T implemented a trial secondary market program with its ComKey system, which was the carrier's state-of-the-art key system at the time. Shortly thereafter, AT&T began to announce policies that included reinstallation and continued maintenance for used ComKey systems, essentially mirroring what IBM was doing with used computer equipment.

A group — the National Association of Telecommunications Dealers (NATD) — was formed to ensure the integrity of the emerging market. Users and industry pundits began to get excited about the prospects of a billion-dollar industry by 1990.

But something happened on the way to that billion. A few of the key players — mainly the distributors — decided not to play. Unfortunately, distributors control the field.

The basic difference between the way telephone equipment is distributed and the way computer equipment is distributed is that most telephone equipment — with the exception of AT&T's — is handled by independent distributors, not by the manufacturer.

These distributors make a lot of their profit from the add-ons to telephone systems. And since the telephone equipment market is not plug-compatible, they usually have had a fairly captive audience, ensuring good profit margins. Imagine their reaction to the thought of some out-of-town company calling into their base to sell used parts.

Since the distributors controlled the playing field in their respective areas, users could do little except gamble or complain. Relatively few second-hand systems were sold because it was so difficult to coordinate the chore of installing them. The market became a parts trading business, rather than an alternative systems industry. AT&T's support and enthusiasm waned, and the market flattened.

Currently, most of the large manufacturers have created some sort of half-baked program in response to user complaints. But changes have started taking place lately, and the market for second-hand telecommunications equipment is going to get interesting.

First of all, users have discovered that buying secondary parts and systems is a good deal. These commodities are as good as new at less cost, especially when under maintenance for such items as new parts. Second, the distributors that opted out are realizing that "you can't fight City Hall." They are now getting into the business, creating a used interconnect system market.

However, if users don't watch out, these same distributors will eventually reduce the competition within their marketplace. They could control the prices within their territory by making installation and maintenance tough via bogus certification charges and such.

Users must make sure that manufacturers of telephone equipment establish clear-cut, clearly costed programs to allow for the redistribution of used systems and parts, with installation coordinated using the normal lines of distribution. There are several ways to achieve this. Make noise in user group meetings. Contact the NATD to see how you can help promote this industry. Write to your distributors, including the regional Bell holding companies, and demand better support for used equipment. It's time that users rallied behind this potentially vital opportunity. ◘

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EDITORIAL

Vendor-driven industry consortia lack user input

It's difficult to complain about the vendor-driven consortia that have arisen over the past couple of years to address such technologies as frame relay, integrated network management, Switched Multimegabit Data Service and Asynchronous Transfer Mode, among others.

By joining forces to define common implementations of often confusing standards, vendors can reduce development risks and bring important new technologies to market more quickly. Working together, vendors can help a market take shape amazingly quickly.

A case in point is frame relay. One of the key factors in the meteoric rise of frame relay was the work done by the Frame Relay Implementors Forum, which deserves credit for spurring the availability of frame relay interfaces and services.

Vendors have learned the painful lesson of Integrated Services Digital Network: Incompatibilities and inconsistencies in products and services can dramatically delay acceptance of a promising technology.

It will be interesting, however, to see how ISDN's fate changes now that carriers and vendors have banded together in the National ISDN 1 effort.

User input vital

There is a little-discussed problem that becomes more nagging as vendor partnerships become more common and more powerful — the limited role of users in defining the agendas and steering the efforts of the consortia.

Vendors are making vital decisions concerning the technologies that will reshape user networks without input from the user community, for the most part. The political wrangling and infighting that occurs within these groups is largely invisible to the user eye. We urge these groups to find ways to encourage appropriate user participation and to give users a forum for expressing their concerns and interests. That only makes sense. The most successful products will be those that meet user needs best.

One group that has made a real attempt to obtain user input is the Network Management (NM) Forum. Through the NM Forum's President's Roundtables, users from around the world can share their views on open net management issues and the forum's work.

The NM Forum has also set up a user advisory council, which meets on a regular basis.

We encourage other consortia to follow the NM Forum's lead, and we urge users to push for a bigger role in these vendor-led groups.

Don't let your future be decided by someone else. ◘

OPINIONS

NETWORK COMPUTING

BY JOHN R. RYMER

Distributed object computing key to open systems

Most users I've talked to say migration to open systems is expensive and painful. The prospect of migrating operating systems, databases, networks, document applications, electronic mail and other system elements to a single set of standards is not attractive to these users. Therefore, they are planning to take 10 years — or even longer — to migrate fully to open systems.

The big problem with open systems today is the almost exclusive emphasis on software portability standards. These standards mostly comprise low-level interfaces and protocols, such as Portable Operating System Interface X (POSIX) and the Open Systems Interconnection networking protocols, which were conceived when software portability was the user requirement that defined open systems.

The major portability standards seek to create, at minimum, a single set of application program interfaces for every function of an operating environment, including networking and data management. In addition to interfaces, OSI networking standards are creating actual protocols.

This emphasis on software portability will result in a completely open environment — eventually. Unfortunately, it will be years before a large group of vendors implements even a rudimentary set of portability standards.

Meanwhile, integration, not portability, has become the user requirement that defines the open systems movement for the 1990s. Large users have begun to realize they can benefit significantly by integrating the functionality and data of their diverse systems. Early commercial adopters of Unix as an open systems strategy were the first to realize this.

Typically, these users built new applications using Unix systems, but to make them workable, they had to provide for integration and interworking with IBM mainframes and Digital Equipment Corp. VAXes, among other machines.

However, a new approach to open systems, which I call distributed object computing, can meet this requirement for integration and interworking standards. It also promises to support development of software assets without compromising the good work that has gone into portability standards.

> The problem with open systems is the emphasis on software portability standards.
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The distributed object approach has two parts. The first comprises distributed computing technologies such as remote procedure calls (RPC), distributed file systems and remote SQL database access. These technologies and their interfaces can be used to create applications that use services running concurrently on diverse systems.

For example, a developer can use an RPC supported on a Unix workstation, a Novell, Inc. NetWare server and an IBM mainframe to create applications that call on the services of all of those platforms. Now that's openness.

The second part is distributed object management. This technology hides distributed networks of diverse systems under simple, smart interfaces, making such systems transparent to the user and the developer. For example, System A calls on System B to perform a service without needing to know the details of how System B is configured.

I find the distributed object approach to open systems attractive for three reasons. First, its aim is to meet user requirements for integration and interoperability rather than software portability.

Second, the distributed object approach inherently recognizes the diversity of system architectures that may exist in an environment. The distributed object approach seeks to set common interfaces for applications at a higher level than the major portability standards.

Thus, the approach does not require users to upgrade to a POSIX-compliant version of DEC's VMS or even an OSI-compliant version of DECnet to integrate diverse systems. If an application under Microsoft Corp.'s Windows needs to interact with a VMS application, the distributed object model would enable the Windows application to send a message to the VMS application requesting it to perform a task and return the result.

Third, because the distributed object approach allows for diversity of underlying system architectures, it narrows the requirement for users to migrate to standard-compliant versions of operating systems, networks and applications.

The distributed object approach requires a mechanism to transport service request messages, a service to coordinate delivery of messages, and applications and services, such as databases, that support a messaging interface. This strikes me as being much easier than migrating applications from proprietary operating systems to POSIX-compliant operating systems.

Distributed object computing technology is emerging rapidly. It will enable the open systems movement to accommodate user needs for integration technologies better than portability standards can. In the end, that will be good for everyone. ◘

Rymer is editor in chief of Patricia Seybold's Network Monitor *and vice-president of Patricia Seybold's Office Computing Group in Boston.*

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TELETOONS

BY FRANK AND TROISE

Of course I appreciate working with a responsive, hands-on vendor... but could you fix the net **before** the shiatsu massage.
Phil Frank

LETTERS

Fax is here to stay

I'm writing regarding the recent column "Does facsimile technology have a future?" by William Robinson (*NW,* Sept. 2). I disagree that the complaints about fax in the article indicate its impending demise. With 200 dots per inch, the quality of reproduction is quite good and usually better than the computer-printed documents I receive.

Despite the availability of laser printers, the majority of computer-generated documents are printed on a nine-wire matrix printer that needs ribbon changes.

In any case, nothing inherent to fax technology limits its quality. Any degradation of quality that occurs is strictly in the scanning phase.

Documents sent directly from a computer to a fax receiver have excellent quality. Plain paper fax is readily available and eliminates all the issues concerning thermal paper.

In addition, Group IV fax will increase the resolution to 400 dots per inch.

The author seems to suggest that systems mixing voice, video and data traffic are commonly available and in high demand.

This isn't a limitation of fax technology. In fact, the integration of fax with voice, video and data has been accomplished in a routine fashion.

On the other hand, integration of voice and data has been an abject failure.

The author's criteria for determining the long-term significance of a technology would cause many of the most momentous advances that have occurred to be regarded as intermediate steps.

The security and receipt acknowledgment weaknesses

(continued on page 42)

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CONTINUED FROM PAGE 1

bling plan that gives them flexibility into the distant future. This should include several types of wiring media that support not only the user's current applications, but others that may come down the pike over the life span of the cable plant.

For instance, managers might choose to install a mixture of wires: low-grade unshielded twisted-pair wire for voice, higher quality shielded or unshielded twisted pair or optical fiber for low-speed LAN traffic, and optical fiber for high-speed LAN traffic, imaging and video applications.

In the past, this wasn't the case for most users. Buildings were generally wired for telecommunications — often during initial construction — and data communications wiring for terminal-to-host traffic was added separately. This approach has changed.

Before the popularity of LANs, every desk needed a phone, but not every desk needed a data port. Now, and for the foreseeable future, LANs and emerging high-speed data communications applications will drive premises wiring designs.

As end users start implementing applications requiring more bandwidth than the existing cable plant can provide, many network managers find themselves at a crossroads. Although the pressure to install new cabling to support user demands today is great, network managers shouldn't rush into any decisions.

Not only do they have to ensure that the selected cabling plan supports future uses during its life span, but they also have to make sure the selected cables and associated physical connectors used to plug the cable into telephones or data devices are reliable.

This is because a good cabling plan is vital to any organization's operations. Selecting just any cabling plan simply won't do, according to many network managers and cabling experts.

Cabling can be a big part of network downtime. "We've found 35% of all network problems are at the physical layer," says Ed Barrett, president of Reading, Pa., network system integrator Hi-Tech Connections, Inc. "That includes problems with the cabling and the connectors." Cabling and connectors often fail due to normal wear and tear.

So, it should be no surprise that selecting a good cabling plan is not the easiest thing to do. While there is a wealth of cabling vendors to choose from, there is little help available in designing a good plan or determining how cables should be installed.

Industry groups try to help

Perhaps the best source of what little help is available now is the structured cabling specifications developed by the Electronic Industry Association (EIA) and the Telecommunications Industry Association (TIA). EIA/TIA 568 is a commercial and industrial building wiring standard that provides guidelines on how to design a structured cabling system.

The EIA/TIA standard breaks

(continued on page 36)

ILLUSTRATION ©1991 MARCEL DUROCHER

(continued from page 35)

a building's cabling system into components including the backbone, wiring closets and horizontal cabling. The standard also specifies the type of wiring for each component. For example, it specifies the maximum distances between a building's main distribution frame and wiring closets for each type of media in the backbone, as well as the maximum distances between a wiring closet and a faceplate for each type of media in the horizontal run.

The specifications are general enough to allow users a choice in design and media. This is both an advantage and a disadvantage. On the positive side, the specifications give enough freedom to design a cabling system to meet every conceivable networking need. The downside is that the specification is so general — particularly in what type of media to use in horizontal cabling — that the net manager is not given any specific information.

In the backbone, the EIA/TIA standard lets users choose from four media: 100-Ohm unshielded twisted pair, 150-Ohm shielded twisted pair, 50-Ohm coaxial cable, or optical fiber with a core diameter of 62.5 microns and an outer core diameter of 125 microns, which is typically called 62.5/125 micron multimode fiber.

As with most of life's decisions, there are no clear-cut answers for every cabling question.

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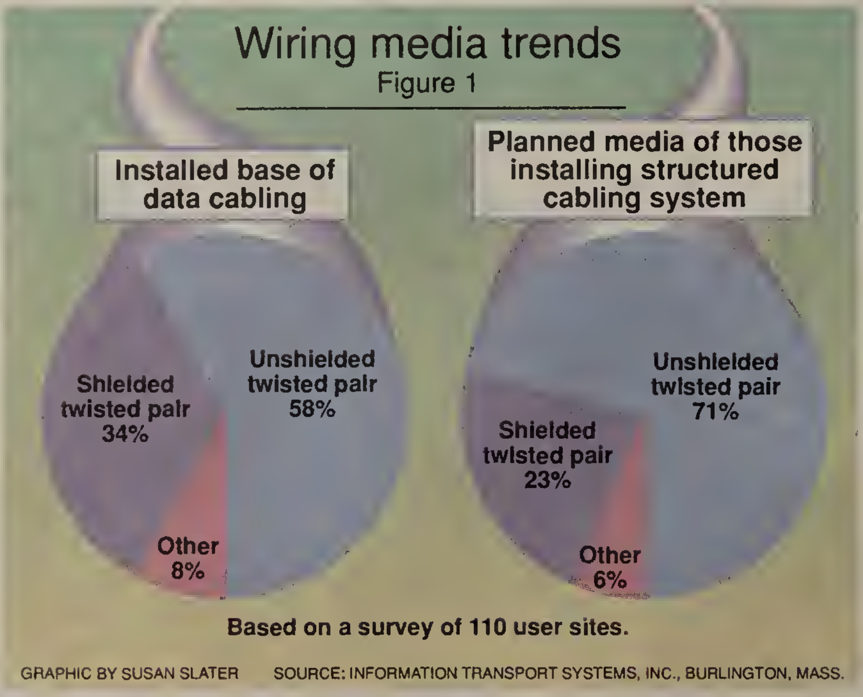
Users, however, are settling on two media for their backbones. "Backbones that use [unshielded twisted pair] for voice traffic and fiber for data are becoming the norm in many user facilities," Barrett says.

The EIA/TIA standard also gives guidelines for the selection of media to make the connection from the wiring closet to the faceplate. Similar to the backbone section of the standard, such horizontal wiring guidelines cover all types of media.

While there is much choice in what type of media to select, two distinct schools of thought on cabling media are emerging. They are optical fiber to the desktop and unshielded twisted pair to the desktop. Yes, some users have installed or will install coaxial cabling and shielded twisted pair (see Figure 1, this page). But recent developments such as the acceptance of 10Base-T by users and the possibility of sending data at the Fiber Distributed Data Interface standard rate of 100M bit/sec over unshielded twisted pair strengthen the case for unshielded twisted pair.

Making the choice

Unshielded twisted-pair wiring for data communications seems very attractive and not only because of the assumed price savings over fiber. The main reason is because it allows net managers to design and manage data network cabling just as they do their unshielded twisted-pair telephone cabling.



GRAPHIC BY SUSAN SLATER SOURCE: INFORMATION TRANSPORT SYSTEMS, INC., BURLINGTON, MASS.

However, users should carefully examine the pros and cons of both media and possibly even consider installing a combination of unshielded twisted pair and fiber. The unshielded twisted pair could be used now, while the fiber could be tapped when needed.

Optical fiber and unshielded twisted pair to the desktop each have advantages and disadvantages. Users who have installed one or the other display near-fanatical enthusiasm when describing their choice of media.

For instance, users selecting unshielded twisted pair prefer it for its low cost and the ability to employ the same traditional installation techniques used to wire their telephone systems.

Proponents of optical fiber cite the media's high bandwidth, its immunity from electrical interference from nearby motors and other devices, and its lack of crosstalk when fiber cables are run parallel to each other. This is not true with transmissions over unshielded twisted-pair wiring, which can be impaired by electrical interference and crosstalk that develops when wires are run parallel to each other.

Arguments against either media often are mirror images of their benefits. For example, fiber proponents cite unshielded twisted pair's low bandwidth and susceptibility to electrical interference and crosstalk as negatives, while proponents of unshielded twisted pair point to fiber's high costs and the difficulties associated with installing the media.

As with most of life's decisions, there are no clear-cut answers for every user's cabling questions. After looking closely at the issues for their particular wiring problems, users may find the generalities above are no longer true for their particular wiring needs.

Users that recently wired their facilities found these generalities indeed did not hold for them. For example, take the argument against fiber because it is supposed to cost more than copper wire.

Raymond Neff, vice-president for information services at Case Western Reserve University in Cleveland, found the labor costs to rewire were much higher than the cost of the cabling itself. He also found the cost of installation was about the same for both unshielded twisted pair and fiber.

Case Western's facilities were rewired using six fibers — two single-mode fibers and four multimode fibers — and eight unshielded twisted-pair wires to every faceplate.

Neff hired an installer — Robbins Communications, Inc. of Pittsburgh — to rewire the entire campus and found the labor of installing the cabling was about 40% of the overall cost while the cable itself was 30%. The remaining 30% was made up of electronic components, such as hubs and network adapters.

"Users should design cabling with a 10- to 15-year payback period."

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So, even though the fiber cost more than copper, the cabling itself is not the largest part of the expense. Still, some contend that there is a major difference in price. But many others contend that the price difference is trivial when one considers the average lifetime of a wiring system.

"Users should design cabling systems with a 10- to 15-year payback period," said Glenn Dinetz, director of network solutions marketing at Roseland, N.J.-based systems integrator American Management Systems, Inc. Given that the average cost difference per node between fiber and unshielded twisted-pair systems is generally about $100, that means it only cost about $10 per year per node more to use fiber.

D'Arcy Roche, chief executive officer of Raylan Corp., a fiber-optic equipment maker in Menlo Park, Calif., likes to put this $10 figure into perspective by noting it is about the cost of buying a box of floppy disks for each workstation each year.

Another reason cited for not using fiber to the desktop is that it is currently more difficult and expensive to install and to outfit with a connector. However, this is an area that has changed quite a bit due to technological innovations and some clever techniques developed by cable installers.

Traditionally, there was a notion that attaching a connector to fiber required a laborer more highly skilled than if the installation used copper wire. The most common technique for attaching connectors is to use a splicing tray in the area where the cable terminates.

All wires are not created equal
Figure 2

Cable level	Typical use
Level 1	Voice transmissions
Level 2	Data transmissions up to 4M bit/sec
Level 3	Data transmissions up to 16M bit/sec (usually the cable of choice for Ethernet LANs such as 10Base-T)
Level 4	Data transmissions above 16M bit/sec or to extend distances in lower-speed LANs

Wire and cabling manufacturers have developed a labeling scheme to differentiate the grades of unshielded twisted-pair wires. However, the quality of cable within a category varies greatly from vendor to vendor.

GRAPHIC BY SUSAN SLATER SOURCE: *NETWORK WORLD*

The fiber is pulled out of the hole in the wall where the faceplate will go and is cut and inspected to make sure the cut produced a smooth surface to which another fiber will be bonded. Then a pigtail, a device with a connector and a piece of fiber attached, is mated to the cut fiber.

The process usually involves the use of an epoxy glue with the same light transmitting properties as the glass in the fiber cable. The two fiber ends are pushed together with the epoxy in the middle, and the epoxy is then hardened.

Once the connection is complete, the installer moves on to the next faceplate. The process also has to be completed on the other end of the cable in the wiring closet. This process is much more time-consuming, about five to 10 minutes for each end, than it is with copper wire. With copper, a person typically uses a crimping tool to mate the connector to the wire in about 2 minutes and moves on to the next one.

Given this contrast, many see fiber as labor-intensive and, thus, much more expensive to implement. However, fiber installers have developed methods to reduce the time it takes to terminate fiber. For example, one installation firm made some relatively minor changes in the process and improved the time to terminate.

Many see fiber as labor-intensive and more expensive to implement.

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"There's a large set-up time [per faceplate] for fiber, and there is the awkwardness of the working area that slows you down," says Peter Haigh, president of JWP Network Services, a cabling system designer and installer in Pittsburgh. "Usually, installers are working about a foot off the ground and under someone's desk."

"To improve the process, we buy fiber that is preterminated at one end," Haigh says. "We start the preterminated end at the faceplate and pull the cabling from the faceplate to the wire closet." Once all the fibers have been pulled to the wire closet, a laborer goes in, sets up once and terminates all the fibers in one session.

This method saves the set-up time at each faceplate, and workers have more room to do their jobs. "It gives you an economy of scale performing all the splices when only setting up once," Haigh says.

Another development is also reducing the time it takes to mate a fiber to a connector. AMP, Inc. of Harrisburg, Pa., which makes

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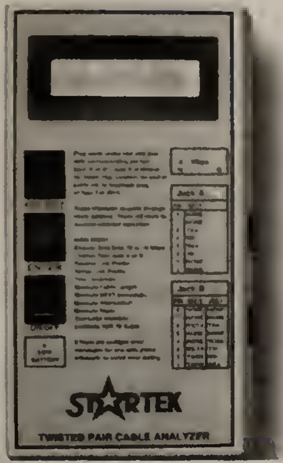

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connectors for many types of cables, developed the equivalent of a crimping tool for fiber. "A person using the tool for the first time can perform the connection in about 2½ minutes," Roche says. "With practice, they can reduce the time to about two minutes. And that's the same amount of time it takes to terminate copper."

These savings address one of the issues that critics of fiber raise, but another sticking point with many users is that the electronics needed at the ends of a fiber cable are more expensive than those for copper. However, at NetWorld 91 Dallas this month, Raylan introduced a line of fiber-optic hubs and adapter cards that it claims are priced similarly to unshielded twisted-pair hubs and adapter cards ("Raylan offers PC LAN interfaces for fiber," *NW*, Sept. 30).

One analyst at the show agreed the pricing was comparable, but he cautioned that because Raylan is the only one at this time offering such a product, users would be tied to a single vendor.

That cautionary note aside, if these developments have truly brought the cost of fiber into the same domain as unshielded twisted pair, why would anyone want to stay with unshielded twisted pair?

Unshielded twisted-pair proponents say there are ways to get around the media's bandwidth limitations.

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To make matters worse, a single unshielded twisted-pair cable cannot offer the same bandwidth as a strand of fiber, leading many to believe that fiber will be the best alternative to support imaging and other bandwidth-intensive applications.

However, unshielded twisted-pair proponents say there are ways to get around the media's bandwidth limitations. For example, better segmentation of LANs will help because the wire will have to support less traffic. Compressing images before they are sent out over the network will also help. These are limited solutions, and they carry additional expenses — such as the cost of the bridges or routers to segment the LAN traffic or software that compresses and decompresses data.

The coup de grace

Perhaps the main factor attracting users to unshielded twisted pair is all the activities in the standards bodies. Ethernet over unshielded twisted pair has been standardized through 10Base-T. And work is being done on two other standards — one permitting 16M bit/sec token-ring to run over unshielded twisted pair and the other for FDDI over unshielded twisted pair.

Since most buildings have unshielded twisted-pair wiring, some people assume they can use existing wiring for all their future needs. This is not the case.

"Unshielded twisted pair is an undefined term," says Hi-Tech Connections' Barrett. "There are many grades of unshielded twisted pair, and there are no standards to define the [grades]."

Many cable manufacturers offer a range of unshielded twisted-pair cable grades. Depending on the application, the cabling companies suggest a grade level ranging from Level 1 to 4 (see Figure 2, page 36). However, Barrett cautions users that these labeling levels do not give the user an idea of how the wire will work in their network.

"The levels don't tell the user how many nodes they can support or how far a workstation can be from a wire closet," Barrett says. To overcome this problem, the Underwriter's Laboratory and the National Electrical Manufacturers Association (NEMA) are developing standardized labeling schemes for unshielded twisted pair.

"NEMA is coming up with electrical specifications that define the electrical properties a wire must meet to be classified at a certain level," says William Spina, managing partner of Information Transport Systems, Inc., a Burlington, Mass., provider of consulting, engineering design services for cabling systems.

Either way, you must rewire

While the standards bodies work out the details, many users will have to make their cabling decisions. Can a user stay with currently installed cabling for a while longer? That would depend on its quality.

"If you have unshielded twisted pair that was designed for plain old telephone service, it won't support the LAN data rates of today," Barrett says. "That old wiring was designed to carry analog voice, and you can practically do that with a wet string."

To avoid encountering problems with older wire, some installers caution users to have cabling inspected if it was installed over more than five years ago.

If users want to carry Ethernet traffic over unshielded twisted pair, they need wiring that is at least a Level 3 rating. As mentioned above, one company's Level 3 cable may not have the same characteristics as another's. But the selection of Level 3 cabling can be a starting point in the search for the right cable to support this application.

(continued on page 38)

16 MB/S TOKEN RING

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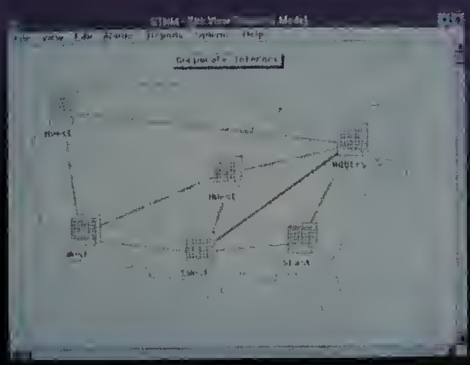
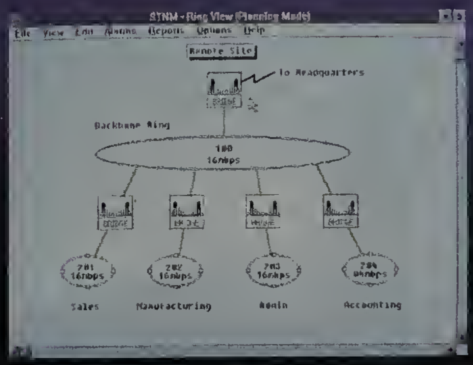

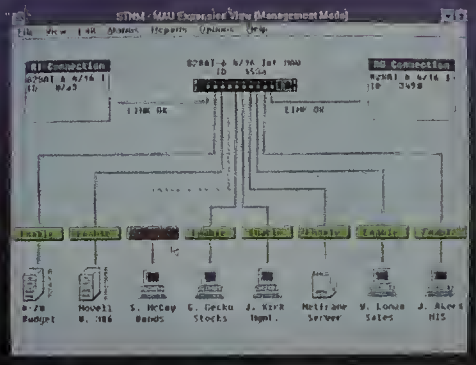

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Take a direct route in cabling selection

continued from page 37

If future plans include moving to 16M bit/sec token ring or FDDI over unshielded twisted pair, a higher grade cable will be needed, according to Spina and Barrett. And most buildings do not have this type of cabling installed, Spina says.

Where does this leave the network manager that needs to make a cabling decision? Because they will get little direction from standards on which media to use in horizontal wiring, network managers must become experts at many technologies as well as at evaluating their costs.

When considering optical fiber, a net manager must bone up on the latest developments in terminating and splicing fiber cabling, for example.

If the choice is unshielded twisted pair, the network manager will need to track the developments of the IEEE 802.5 working group that is tackling 16M bit/sec over unshielded twisted pair and the three groups within ANSI trying to develop schemes that will deliver 100M bit/sec data transmission rates over copper.

Once all the information is gathered, the network manager will need to fire up a spreadsheet program to compare the cost per node for fiber vs. other media.

And if all goes well, the task won't have to be performed again for another 10 years or so. ◘

Poland turns to U.S. for upgrade help

continued from page 27

with the state Radiocommunications Agency, which is similar to the Federal Communications Commission, said Poland's new communications law will allow private firms to provide many services. International voice and telex must be provided by the government communications firm, but other services can be provided by private Polish companies.

Long-distance domestic services can be provided by private firms that have as much as 49% foreign ownership, Ksiezny said. Local services will be wide open to private and foreign firms.

Although the local service providers will have to apply for a license, there will be no limit on the number of competitors, according to Dabrowski.

Poland's ambitious network modernization will cost between $30 billion and $35 billion over the next 10 years, according to Miroslaw Fereniec, director of the economics department for the Polish Ministry of Telecommunications.

But, as Dabrowski said, "Poland has no money." Therefore, Polish network planners are hoping to get credits and loan guarantees from foreign governments to help purchase the necessary equipment.

Addressing need for technology

Poland is also working directly with U.S. firms to obtain the necessary technology.

In order to encourage governments to give such credits, Polish officials realize they are going to have to use equipment and products from more than one vendor, Zejdel said. Thus, one of the main requirements imposed by the government will be adherence to international standards and up-front work on interfacing various vendors' equipment.

This approach is necessary not only to accommodate various vendors' equipment as the new network is deployed, but also to incorporate the existing network facilities.

"Although the network will be continually modernized on a local basis, the old switches will still be in place for the next 10 to 15 years," Zejdel said.

Consequently, Poland will need new management and operating sytems to incorporate the old with the new, he added. ◘

DEC beefs up InfoServer storage

continued from page 29

al computers to communicate with it. A client workstation shell enables users to view data in their native formats.

The device comes with a single Ethernet connection to attach to a LAN.

In a base configuration, it includes a 120M-byte hard disk drive and one CDROM drive.

It can be expanded to support a 120M-byte disk drive, one 95M-byte tape drive and an internal and external CDROM drive. Additional drives can be purchased separately.

The InfoServer can handle as many as 100 users simultaneously and supports popular CDROM information formats such as the International Standards Organization 9660 and DEC's On Disk Structure-2.

The product enables users to access multiple CDROM drives simultaneously, DEC said. The storage system can also serve as a supplement to personal computer users' hard disks, helping them expand disk capacity.

Available in November, the InfoServer 150 comes in four base configurations ranging in price from $8,800 to $10,800.

Available separately, a stand-alone desktop tape drive costs $4,015, a dual-drive tape enclosure costs about $2,000 and an external CDROM drive costs $1,000.

InfoServer 100 users can upgrade from Version 1.1 of the InfoServer software to Version 2.0 for $600.

For more information, contact DEC at 146 Main St., Maynard, Mass. 01754, or call (617) 897-5111. ◘

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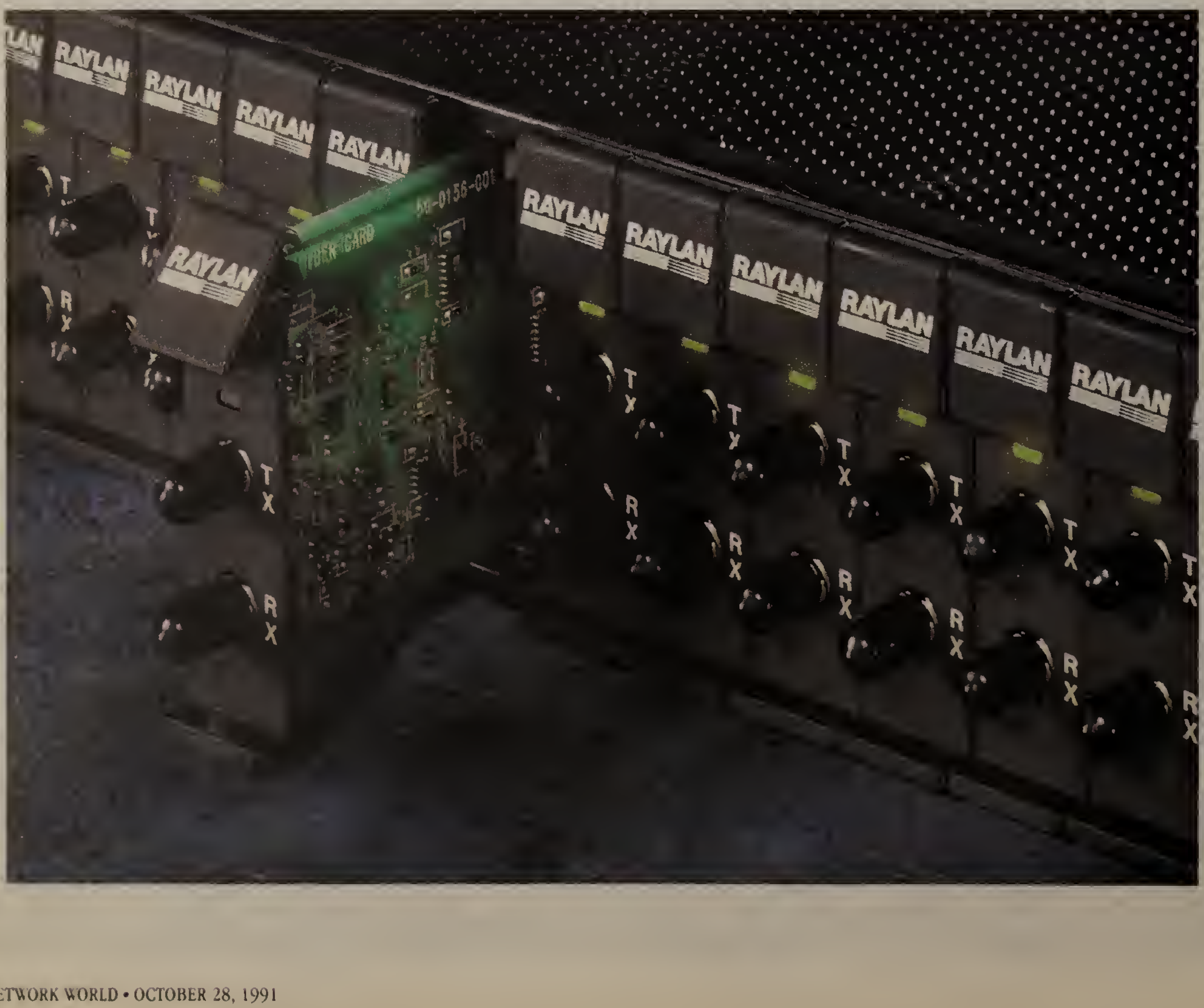

Swiss adapt to new telecom era

New legislation and PTT attitude make Switzerland's networking climate warmer for users.

Switzerland, the site of the Telecom 91 Exhibition and Forum in Geneva earlier this month, is also an important European telecommunications hub for multinational companies. Perhaps this is because Switzerland's telecommunications policies have been liberalizing rapidly during the past year, giving business users more flexibility.

This year — which also happens to be the 700th anniversary of the Swiss Confederation — a new law was passed to revise Switzerland's telecommunications regulations.

Although the new law retains

(continued on page 40)

Zalman is a telecommunications consultant and freelance writer who lives in Geneva and concentrates on high technology and standards activities throughout Europe.

ILLUSTRATION ©1991 LAURA TARRISH

By HENRY ZALMAN

(continued from page 39)

the Swiss post, telegraph and telephone administration's monopoly on basic services — which are defined as telephony, leased circuits, telex and packet networks — there are some changes.

For example, value-added networks, formerly allowed only in exceptional cases, will now be explicitly permitted. While the new law will still prohibit users from reselling capacity on their private networks, they have been told that exceptions will be allowed as long as the situation doesn't harm the financial or operational viability of the Swiss PTT (see Figure 1, page 42).

Several factors spurred the adoption of the new law, which was first proposed in 1987. It was finally passed by the Swiss Parliament in July and will take effect when implementation directives from the government are finalized early next year.

> "With new, younger people at the top of the PTT, more consideration is being paid to user concerns."
>
> ▲▲▲

One of the major factors behind the law was pressure from users and suppliers, according to Albert Mottier, manager of telecommunications services at Nestle S.A. in Vevey, Switzerland, and a member of the Swiss user group Association Suisse d'Usagers de Télecommunications (ASUT).

"With new, younger people at the top of the PTT, more consideration is being paid to user concerns," Mottier says.

ASUT represents user concerns to the Swiss PTT and other carriers. Most of the group's opinions have been incorporated into the new law, Mottier adds.

User influence is evident in many aspects of the new law. While users previously were allowed to purchase telephones from private companies, the first phone in their office or household had to be provided by the PTT. This requirement has been eliminated under the new law.

For the past few years, users have been able to purchase their modems and most other terminal equipment from companies other than the PTT. However, all new equipment to be installed on the network requires PTT approval. The current list of approved products includes about 50 telephone models, more than 400 modems and about 200 facsimile machines.

While terminal equipment must still be preapproved, an organization other than the PTT will be selected to handle this responsibility.

A likely candidate to handle this task is Schweizerische Normen Vereinigung, a federal government organization that currently approves electrical devices. The decision will probably be made under the implementation directives expected to be completed and approved by the Swiss Parliament early next year.

The new law also permits more liberalization in the provision of private branch exchanges. Previously, only the PTT could provide PBX equipment. Under the new law, PBXs can be purchased individually but must be preapproved by the PTT before installation.

Data terminal equipment, such as data service units (DSU), was also provided solely by the PTT under the old law, but exceptions could be made for users that could prove a need for a specific type of digital equipment.

The user then leased the equipment, either the DSU or other digital devices such as Group IV fax machines, through the PTT, paying for cost and rental/service charges. Under the new law, users have more freedom in their choice of equipment and can purchase it from a separate organization.

As the Swiss telecommunica-

tions law changes, so are service prices.

"The general trend is downward, slowly moving toward cost-based services. There is also simplification of the tariffs," says Max Kunz, an ASUT council member and telecommunications regulations and external relations consultant for a large multinational firm in Geneva that requested anonymity.

Swiss tariffs have traditionally been high, but price cuts in March have made them more competitive with other countries' rates (see Figure 2, page 42). A three-year contract is discounted 5%, and a five-year contract by 10%.

An additional 10% discount is given for more than one circuit terminating at the same destination and billed to the same customer. However, there are no other volume discounts.

"We have been pushing [for more discounts] for a long time," Kunz says. The new law's requirement for cost-based tariffs implies future volume discounts.

He also contends that "PTTs have traditionally inflated prices, and Switzerland is not an exception." Nestle's Mottier agrees that the Swiss PTT is moving toward cost-based pricing, but he would like to see the PTT stop cross-subsidization of the postal service.

"At the moment, there is heavy cross-subsidization," says Hans Ruegsegger, deputy director and head of telecommunica-

(continued on page 42)

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(continued from page 41)

tions marketing at the Swiss PTT. "But this is a problem of legislation, not of the PTT."

The Swiss PTT offers a large variety of leased data circuits, including both point-to-point and multidrop. Voice-band analog circuits conform to CCITT M.1040 or M.1020 circuit quality standards, and speeds up to 19.2K bit/sec are accommodated on these links.

The PTT also offers digital leased circuits at speeds of 2,400 through 32K bit/sec within Switzerland and in multiples of 64K bit/sec up to 2.048M bit/sec (E-1) within Switzerland and between that country and others.

By special arrangement, rates as high as 140M bit/sec for digital data can be accommodated between some locations within Switzerland. Links within Europe and to the U.S. and Japan are provided by cable or satellite, according to tariff. To some countries, only satellite service is available.

In addition, a national circuit-switched broadband network called MEGACOM is now available throughout the country. Access to MEGACOM is via an E-1 fiber-optic leased circuit to the local central office, and speeds up to the E-1 rate of 2.048M bit/sec are available to users. This service is targeted at occasional high-bandwidth users.

On Oct. 1, the PTT announced that MEGACOM dial-up broadband services were available for connections to Denmark, Finland, Germany, the Netherlands, Sweden and the U.K. Next year, services are expected to be extended to Belgium, Hong Kong, Japan, Singapore and the U.S.

Users of Swissnet, the Swiss Integrated Services Digital Network offering, can access MEGACOM as well.

Swiss PTT at a glance

Figure 1

Telecommunications book value	$6.69 billion
Telecommunications revenue	4.14 billion
Telecommunications costs	3.65 billion
Telecommunications investments	2.07 billion
Central offices	946
Main stations	3.79 million
Main stations per 100 inhabitants	56.3
Traffic (in paid minutes)	
Trunk	7.82 billion
Local	5.71 billion
International (outgoing)	1.15 billion
Domestic circuits	
Interexchange	155,573
Junction	109,502
Trunk	84,652
Packet-switched traffic	9.61 billion segments

GRAPHIC BY SUSAN SLATER SOURCE: DIRECTION GENERALE DES PTT, BERN, SWITZERLAND

Very small aperture terminal and other user satellite services are available by special permission from the Swiss PTT. These services have not been heavily used in Switzerland because, until the new law was passed, equipment and circuits had to be supplied by the PTT and only after the PTT was convinced of the need. Under the new law, circuits will still be provided by the PTT, but users will be able to supply their own preapproved VSAT and satellite equipment.

"In a couple of years, Switzerland will be well positioned with ISDN technology."

▲▲▲

The new law continues to prohibit users from reselling capacity on their leased circuits. Similarly, the new law makes no change in the regulations forbidding connection between the leased lines and the switched network.

Facilities management services are currently available as part of the PTT's network management offering, including the possibility of collocating equipment. A one-stop shopping service for international networks is also planned and may be initiated in 1992.

Users are generally happy with the quality of telecommunications in Switzerland.

▲▲▲

The Swiss PTT's packet network is known as Telepac. Connections are possible at speeds up to 48K bit/sec using CCITT's 1984 version of X.25. Smaller users can dial in at speeds up to 2,400 bit/sec. Telepac supports advanced features such as closed user groups, reverse charging and subaddressing. Charges are based on duration, volume and distance.

The Swiss electronic mail offering is called arCom 400. It adheres to the 1984 CCITT X.400 standards, but an eventual upgrade to the 1988 standards is planned.

The E-mail system supports simple message transmission, multiple distribution, interfaces to telex and fax services, as well as other advanced features. The service currently interfaces with E-mail systems in several other countries.

The current PTT mobile service is Natel-C, an analog cellular system. It currently has more than 100,000 subscribers and is capable of supporting more than 300,000 users. The system is quite popular and has a high growth rate; the number of subscribers more than doubled in 1989. By the end of this year, Natel-C is expected to cover over 90% of the populated area in Switzerland. Call duration is unlimited, and usage of the network for data transmission is permitted.

ISDN

ISDN is available in Switzerland via Swissnet. Swissnet 1, the current network, began operating in 1989 and supplies only Basic Rate Interface service. Currently, it doesn't have a connection to the switched public network.

Swissnet 2, scheduled to be available by spring 1993, will supply Primary Rate Interface service. The Swiss PTT hopes this more mature version of ISDN will bring in a larger group of users. It will provide services such as bandwidth on demand, digital fax and other offerings.

Under the new law, private companies are also able to provide ISDN-based services such as E-mail. However, no one has announced any offerings.

"In a couple of years, Switzerland will be well positioned with ISDN technology," ASUT's Kunz says.

However, Nestle's Mottier is more pessimistic about the immediate advent of ISDN. "I'm sure it will take time to have [ISDN] in operation correctly worldwide," he says.

Users are generally happy with the quality of telecommunications in Switzerland. But Mottier points out that there are still some problems to overcome. "We meet with the PTT and suppliers to get these problems solved," he says.

One user concern has been that any equipment problems must be routed through the PTT, resulting in bureaucratic delays. Mottier says he believes "the new law will change this situation and solve most problems."

Kunz says the PTT is making progress in terms of equipment, regulation and pricing to address user concerns.

Sample tariffs from Switzerland

Figure 2

From Switzerland to:	64K bit/sec		2M bit/sec	
	Terrestrial	Satellite	Terrestrial	Satellite
Australia	NA	$11,465	NA	$117,759
Belgium*	$5,176	$7,123	$55,103	$75,710
Canada	$8,234	$7,106	NA	$75,765
France*	$4,634	$6,094	$54,488	$71,923
Germany	$5,805	$6,574	$61,393	$70,221
Hong Kong	NA	$7,665	NA	$103,448
Japan	NA	$13,203	NA	$131,508
U.K.	$5,883	$7,517	$86,172	$90,194
U.S.	$7,665	$6,772	$79,710	$71,574**

*Includes local end charges.
**T-1 (1.544M bit/sec)

Note: All tariffs are for a full circuit.
NA = Not applicable

All prices, which are per month and at minimum contract requirements, are based on April tariff and are converted at the Sept. 20 exchange rate of $1.45 U.S. Installation costs and local end charges are not included (except where noted). Prices are for information purposes only and will differ in actuality due to exchange rate fluctuation, length of contract, installation costs and other considerations. Carrier discounts, where available, are not included.

GRAPHIC BY SUSAN SLATER SOURCE: DIRECTION GENERALE DES PTT, BERN, SWITZERLAND

Switzerland is not a member of the European Community, but it is surrounded by member countries and is anxious to be a player in the new Europe. How will Switzerland be positioned in 1992?

The Swiss PTT's Ruegsegger sees improving compatibility with European Community regulations, "so there won't be a difference in the offered telecommunications services."

Kunz also sees Switzerland following the European Community's direction. "However, some implementation [of the group's directives] will probably be different [in Switzerland] and, unfortunately, very conservative," he says.

Mottier is optimistic about 1992. "Switzerland will survive very well and adapt itself to the [telecommunications] situation," he says.

Also, Mottier says he is confident the PTT can manage the changing business climate in Europe and sees Switzerland playing an important role in European telecommunications in the 1990s.

Letters

continued from page 33

of fax are not inherent in fax technology. Facsimile messaging systems that provide security and receipt notification capabilities are readily available and are as good as those found on any computer system.

What's more, I can obtain fax messages from my fax mailbox almost anywhere in the world. Despite the many years that electronic mail has been around, I've not seen any hotels that offer data service.

Facsimile's utility and ease of use have made it a ubiquitous technology. In contrast, data communications is difficult to use, and employed a relatively small segment of the population. By a wide margin, more people have already used fax than have ever used E-mail.

Also, the addition of fax gateways to E-mail systems has already extended the reach of E-mail dramatically. It certainly has had much more of an impact than integrating voice or video with E-mail.

Many small businesses function well without the extensive use of data communications. They all, however, have faxes and view them as an indispensable business tool. I'm a power computer user, but I'd give up my computer before my fax.

Fax is temporary only in the sense that everything is temporary and is likely to be ultimately displaced. The world has voted on fax, and the results indicate that fax will be with us for a long time.

Walt Tetschner
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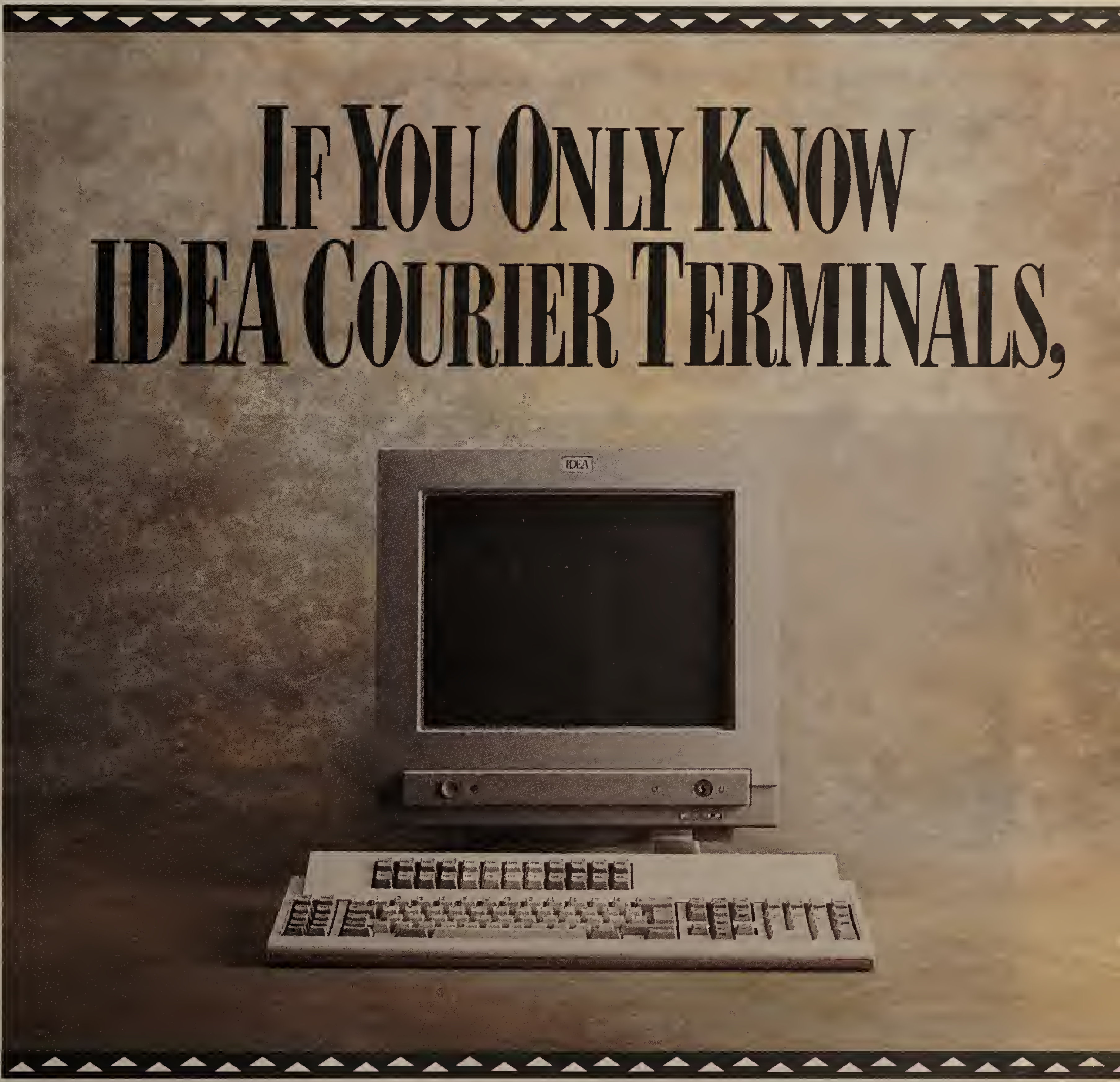
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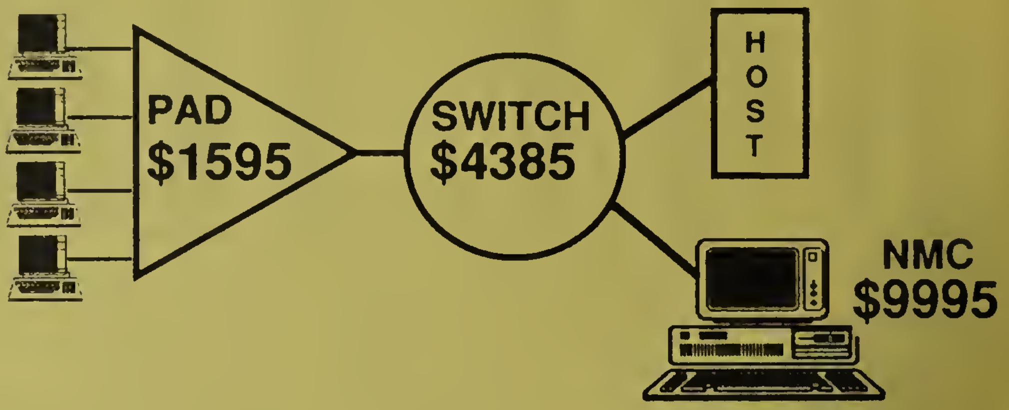

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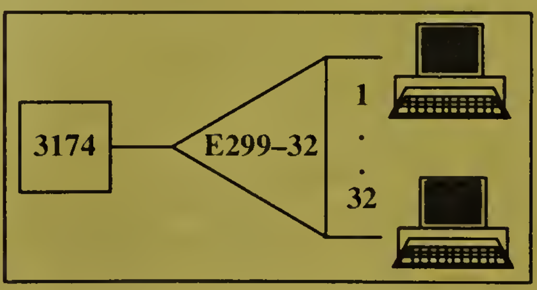

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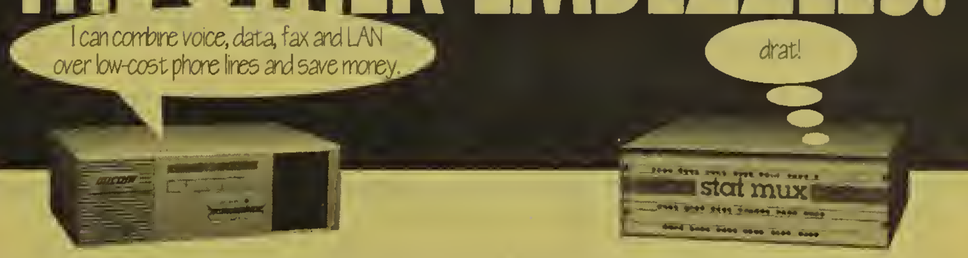
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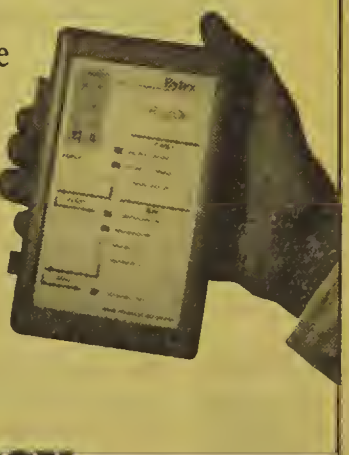

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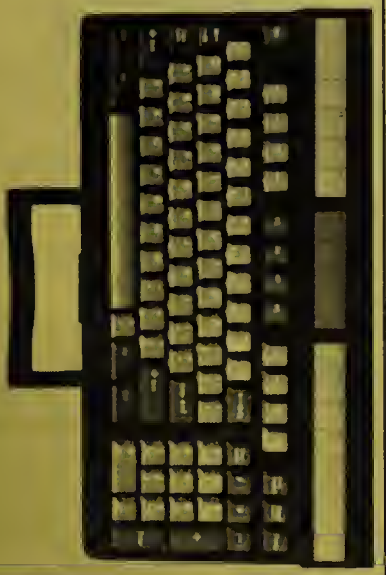

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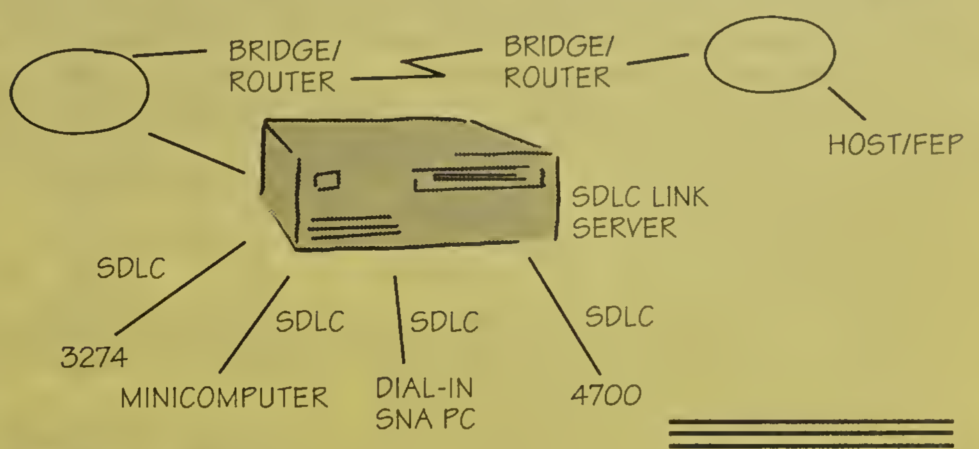

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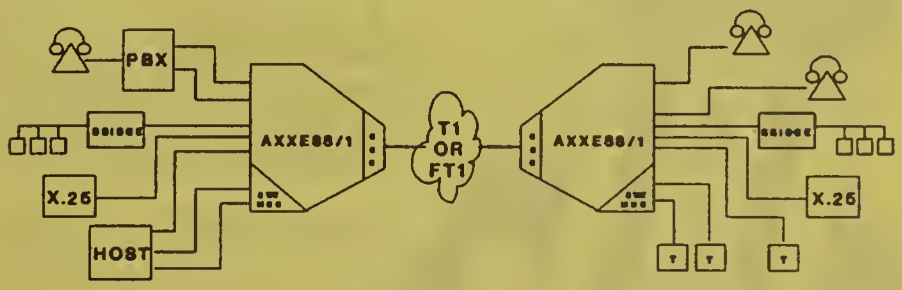

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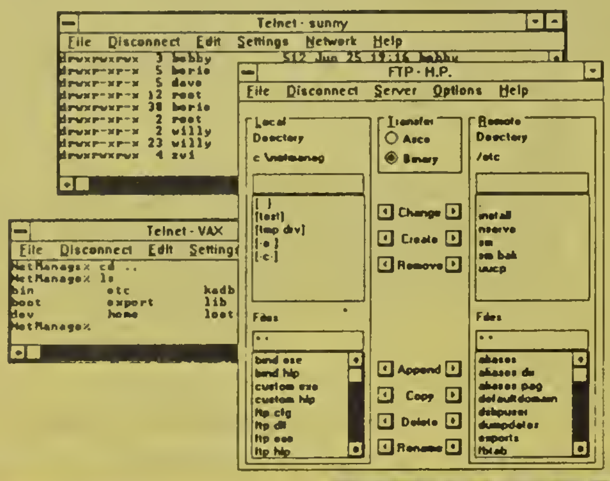

```
drwxrwxrwx  3 bobby          512 Jun 25 19:16 bobby
drwxr-xr-x  5 boris
drwxr-xr-x  5 dave
drwxr-xr-x 12 root
drwxrwxr-x 38 boris
drwxr-xr-x  2 root
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drwxrwxrwx  4 zvi
```

```
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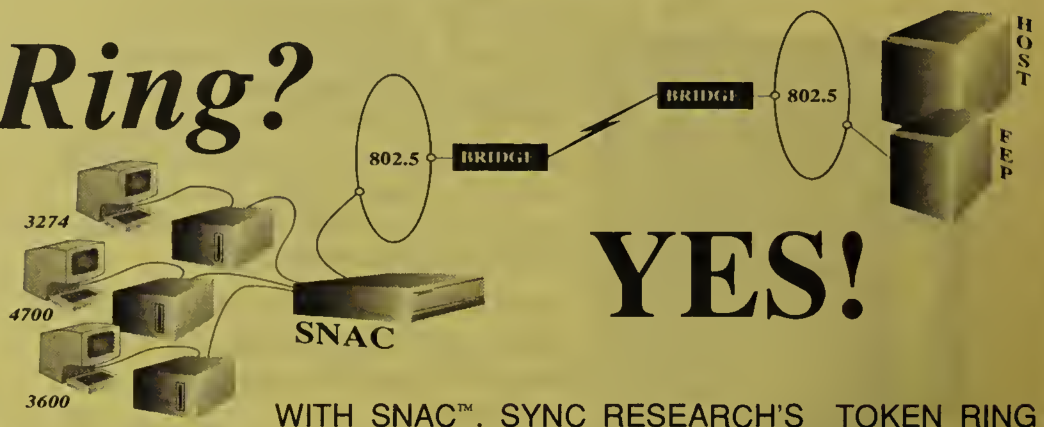

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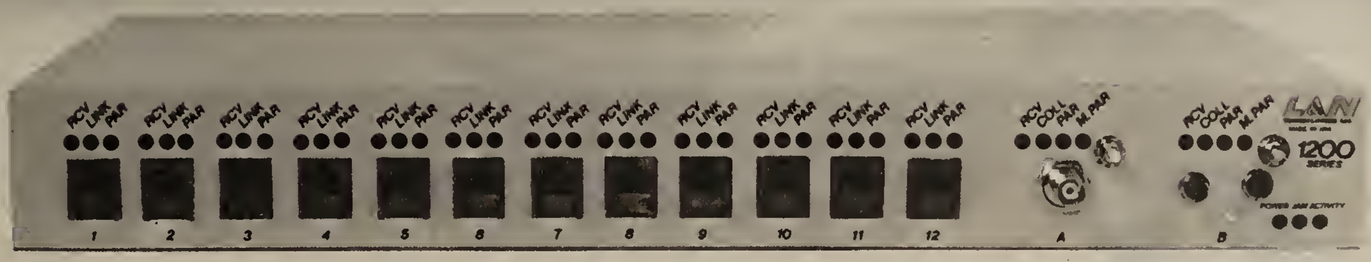

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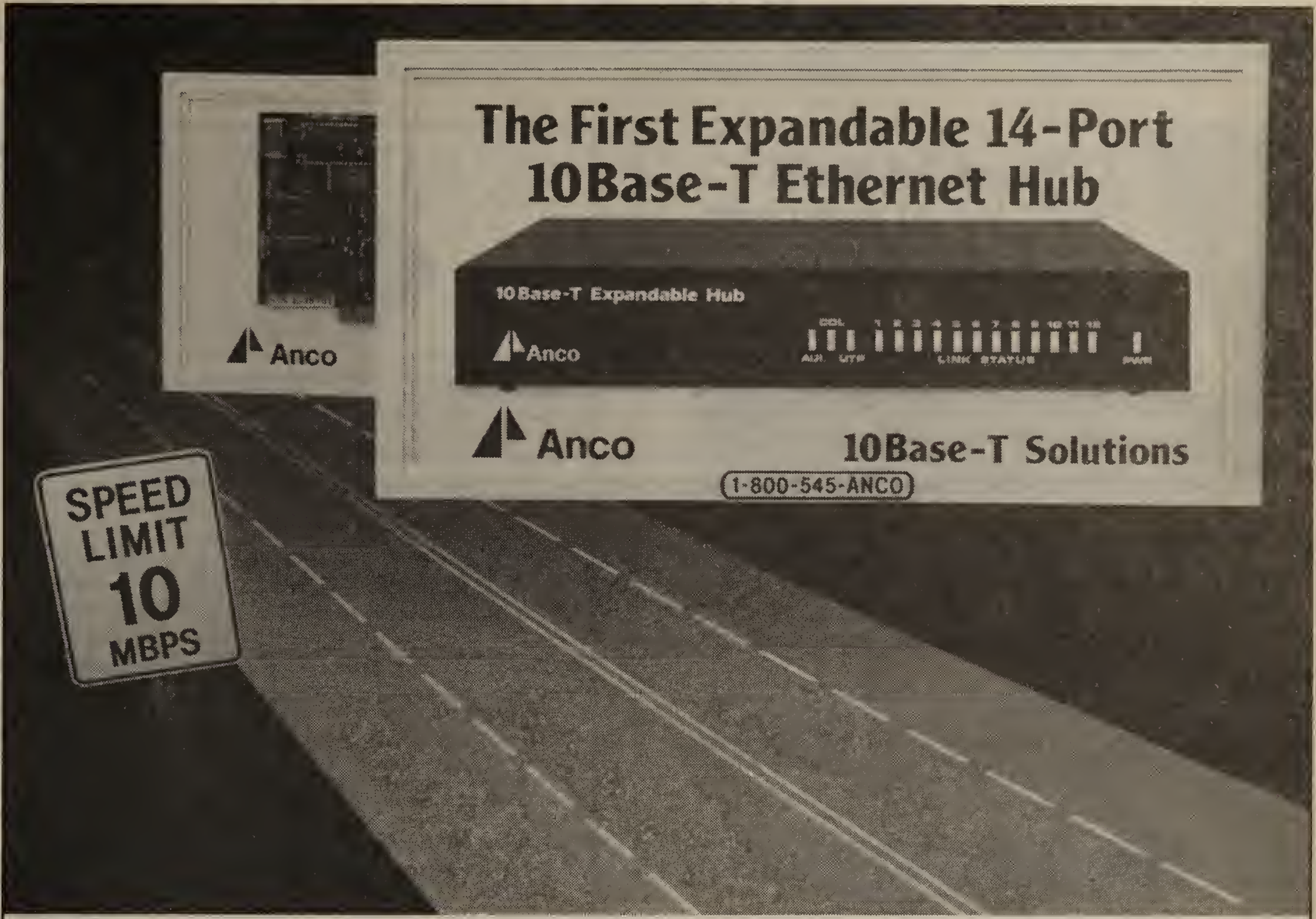

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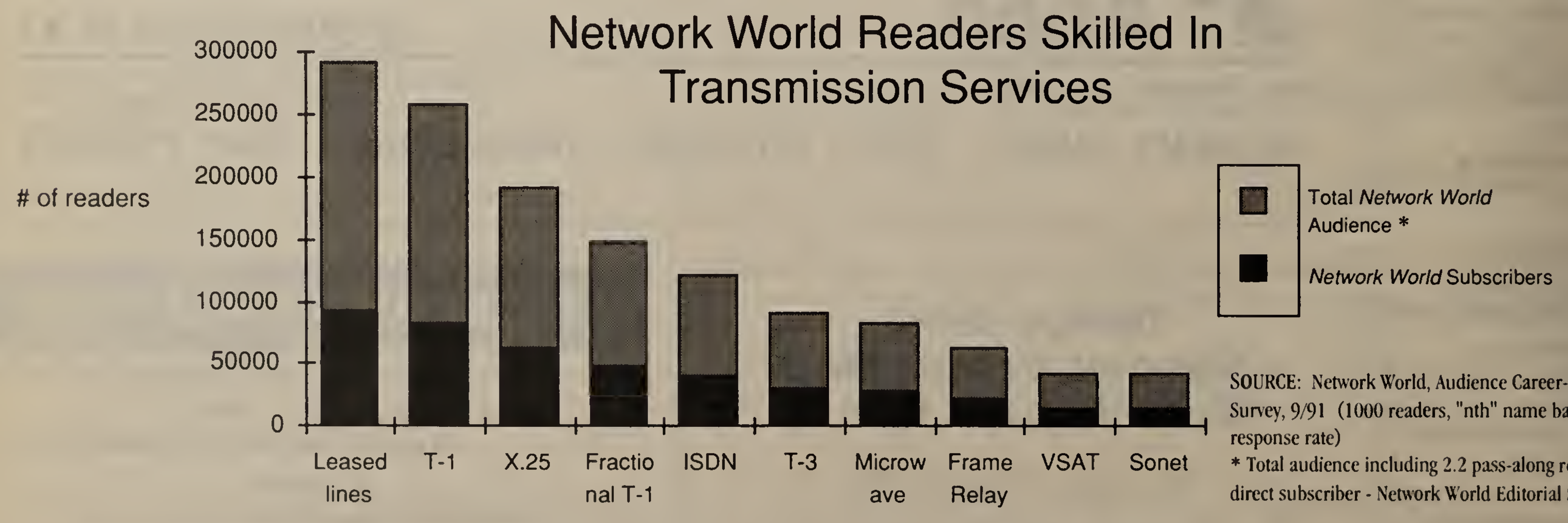

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OMG to release net component

continued from page 6

tion generates a series of messages that are passed via an RPC to the server-based object that describes the elements comprising the report. The broker then executes commands needed to retrieve and merge the elements of the report from one or more systems on the net and deliver it to the user.

The broker determines where objects pertinent to an application are located on a network. The application is shielded from all underlying communications processes, such as transport protocols and RPCs, which are necessary to locate and access the object, Forgione said.

"The broker creates independence between the applications and the computer network," he said. "It knows which protocols to fire up. It takes care of forming that interaction and getting the message across [the network]."

OMG solicited vendor technologies for the project last March ("Object Management Group accepts 7 tech. proposals," *NW,* March 4).

At the heart of it all

The broker is considered the heart of the OMG's Object Management Architecture, a framework for the development of an object-oriented computing environment consisting of a language such as C++, a graphical user interface, distributed computing software and an object-oriented database.

In addition to HyperDesk, OMG developed the broker with code supplied by Digital Equipment Corp., Hewlett-Packard Co. and SunSoft. NCR Corp. and Object Design, Inc. were also involved in the development process, Forgione said.

Specifically, DEC and HyperDesk developed what Forgione referred to as a "dynamic" application program interface (API). When an application issues a request, the dynamic API allows the broker to locate an object that has been relocated to another portion of the net — perhaps an application is moved to a more powerful server — and deliver responses back to the application at run time.

The dynamic API is designed for networks that are growing or have to remain flexible, where objects are changing location, Forgione said.

HP and SunSoft developed code for a "static" API, which allows developers to write and compile calls to objects that are in a fixed location on the network, according to Forgione. If an object is relocated, applications written to the static API need to be recompiled, he said.

NCR, meanwhile, provided assistance in C++ language programming for the static interface. Object Design provided insight into an object database that will house objects for the broker to retrieve.

OMG does not consider the broker to be competitive with other distributed computing technologies, such as the Open Software Foundations, Inc.'s (OSF) Distributed Computing Environment (DCE).

The broker will "sit on top of" and utilize the underlying technologies that make up the DCE, Forgione said.

Even though the DCE incorporates RPCs from HP's Network Computing System (NCS) technology, it can also use Sun Microsystems, Inc.'s Open Network Computing (ONC) RPCs, according to Forgione.

"It makes no assumptions about what RPC is there," he said.

Winning over vendors

Unlike previous industry efforts, such as the RPC wars between Sun and the Apollo Division of HP that plagued the OSF's DCE selection, analysts said the broker will spur software developers to build distributed applications.

The broker "is a better answer to distributed applications than RPCs," said John Rymer, an analyst with Patricia Seybold's Office Computing Group in Boston. "It isn't as difficult to use, and it's more flexible."

RPCs such as ONC, NCS and NetWise, Inc.'s RPC Tool have thus far failed to win over software vendors because they only foster a one-to-one relationship between client and server, whereas the broker can invoke calls to any system on a network, Rymer said. Furthermore, independent software vendors are confused by the bickering between Sun and HP over an RPC standard.

"If [independent software vendors] have to pick a winner, they won't pick any choice," Rymer said, referring to the RPC rift. "It's too risky. The OMG eliminates that whole battle. It's safe to develop applications to [the broker's] API."

FTS 2000 costly, service poor

continued from page 4

Neil Stillman, deputy assistant secretary for information resources management for the Department of Health and Human Services, voiced additional concerns about FTS 2000 pricing. The agency, which previously used MCI, recently switched to FTS 2000 for a large 800-service operation.

Stillman said the agency will spend about $13 million more for 800 service each year than it would have under the MCI contract. He attributed the inflated expenses to higher costs and an added 10% administrative fee.

In addition to the higher prices, Stillman said the technical performance of data lines is worse now than before the move to FTS 2000. He said this was particularly puzzling since the agency used AT&T before the switch and is now on AT&T's network under FTS 2000.

Sidney Haggard, chief of the telecommunications policy division in the office of information resources management for the Department of Agriculture, also reported outages, one of which cut service to the agency's data center for 13 hours. He said it takes much longer to get outages fixed now as well.

Firm strives for 'any-to-any' net

continued from page 25

AppleTalk are the only transport protocols the backbone network will support. Rather than accommodate a growing number of protocols, the company's aim is to eventually converge on OSI routing across the internetwork.

King began building the internet two years ago when the company, formerly Pacific Power & Light Co., completed a corporate merger with Utah Power & Light. The initial requirement was to link the Ethernet LANs at Utah Power's corporate headquarters in Salt Lake City with Ethernets at PacifiCorp's headquarters here.

The internetwork backbone currently supports applications such as electronic mail, executive information systems and electronic data interchange as well as critical file transfers of meter reading data.

Although PacifiCorp's final goal is to consolidate all corporate data onto the LAN internetwork, King said the company still maintains separate facilities for SNA traffic. PacifiCorp has installed several gateways to enable a small amount of critical SNA traffic to be carried on the internetwork.

"Ideally, we want to merge our SNA traffic onto the internet backbone, but it hasn't been feasible yet," he said. "We have more than 150,000 transactions a day running across the SNA net, and it's not prudent to put those onto the internet until the router vendors can provide a viable SNA solution."

Pending bill would up costs

continued from page 25

other software would be subject to the 14-year amortization schedule, although the matter is still under discussion.

The next hearing is scheduled to take place before the House Ways and Means Committee on Oct. 29.

The proposed legislation would also give an advantage to software developers in other countries, such as Japan, that have a five-year or shorter amortization period for software acquisitions.

Since many U.S. software firms acquire software technology to improve core products or expand their product line, their development costs would increase. This would penalize U.S. software developers and threaten the U.S. position as the world leader in software technology, Crandall said.

Crandall also said that unlike other intangibles, the value of software can be accurately determined using a variety of methodologies. He added that current IRS codes, which allow a five-year write-off period, should not be changed. Under the codes, companies can also claim shorter write-off periods if they can demonstrate the software has a shorter useful life span.

Other representatives of the computer industry who testified include Jeffrey Henley, chief financial officer at Oracle Corp.; Dan Kostenbauder, tax counsel at Hewlett-Packard Co.; and Francis Gaudette, chief financial officer at Microsoft Corp.

Ken Phillips, chairman of legislative affairs for the Corporate Committee of Telecommunications Users, an organization that represents the interests of large companies before Congress and regulatory bodies, decried the notion of extending the amortization of telecommunications software.

"The shelf life of telecommunications software is shorter than the hardware it runs on," he said. "Amortizing software for a telephone switch for 14 years is absurd."

Phillips added that the IRS' depreciation schedule for telecommunications equipment, such as central office switches, is terribly outdated and creates a disincentive for carriers to update the network infrastructure and provide end users with advanced services.

Packard Bell intros LAN pack

continued from page 23

software, among other applications. The software is preloaded onto the server and includes a license for the server and each workstation.

"Our application selection is based on extensive studies that determined the leading applications in the Windows environment," Cox said. "Users get all the applications included in the package, even if they only use a small number of them."

The Integrated Network System is available now in configurations ranging from a three-user network for $14,500 to a 25-user network for $61,699.

Not all wine and roses

According to sources, the system has its drawbacks, even though it may well be an easy, one-stop shop solution. First, although the net can support existing devices, Packard Bell said it will not support any network component not purchased with the package, even if it is just a single personal computer.

"We use standard platforms that are compatible with other systems, but we will not integrate them. This is not included as part of the package," Cox said. "We're going to implement a network we know inside and out. We can't be responsible for a variable we know nothing about."

In addition, Packard Bell said it will not use existing wiring, no matter what its condition.

"Seventy percent of network problems point to wiring systems," Cox said. "We want to know our wiring is bulletproof."

Analysts said the cost of the wiring is not an issue since it's included in the price of the overall package. But users will still be subjected to the disruption accompanying rewiring and may have to obtain wiring permits.

SunConnect unit airs products

continued from page 29

FDDI/S, due out in January, supports the FDDI Station Management (SMT) 6.2 standard and includes an SMT proxy agent that allows the adapter to be managed by SunNet Manager.

SunConnet announced the new High-speed Serial Interface/SBus (HSI/S) card, which connects an SBus machine to as many as four wide-area leased lines, each running at speeds up to T-1.

The HSI/S card is intended to enable an SBus machine to function as a communications server for attached workstations.

It works with four software packages: SunConnect's Internetwork Router software for communicating with remote local-area networks and SBus workstations, SunConnect X.25 for access to public data nets, SunLink SNA 3270 gateway software for connecting to IBM mainframes and SunLink SNA Peer-to-Peer gateway for LU 6.2-based communications.

Each of the HSI/S card's four ports can support a T-1 link, although the total bandwidth supported cannot exceed 3.5M bit/sec.

The card is available now and costs $2,500.

Frame relay in pricing battle

continued from page 1

to be available in December, at a Sprint User Conference here this week.

"If I had to rank them in terms of how aggressive they are overall, I would say that CompuServe is the most cost-effective, [followed by] Sprint, then WilTel," said Rick Malone, a principal with Vertical Systems Group, a consultancy in Dedham, Mass. BT North America's service, priced at $2,100 for a single 56K bit/sec port, "is sort of out of the league.".

BT North America only offers frame relay at 56K bit/sec, while CompuServe, Sprint Data Group and WilTel offer at least three connection speeds and numerous committed information rates (CIR), the minimum guaranteed bandwidth for a frame relay permanent virtual circuit.

For most network configurations, that means it is only possible to compare CompuServe, Sprint Data Group and WilTel pricing. While CompuServe and WilTel's pricing strategies are similar, Sprint Data Group's includes a number of options that Malone said can work for or against users.

First, the carrier allows users with limited traffic volumes to choose a usage-based rate, dubbed Standard Rate. The rate is offered with any access port speed and costs a minimum of $10, plus 50 cents per kiloframe up to a maximum of $195.

Theoretically, that means a user could buy a T-1 access port for $2,300 per month and be charged a maximum additional fee of $195 for unlimited usage.

Under Standard Rate, however, users receive no guarantee that bandwidth will be available when they need it, regardless of the port speed employed. Sprint Data Group, which has discussed its pricing structure but not specific rates, said the Standard Rate is intended for sites with noncritical data or with traffic volumes that would be too low to justify a private line, for example.

"Coming on-board with that kind of a [usage-based pricing] system is fairly smart," Malone said, although he noted that most users cannot estimate traffic volumes accurately enough to know whether the Standard Rate is a viable option.

Sprint Data Group also has a different technique from CompuServe and WilTel for pricing its flat-rate service, dubbed Reserved Rate, under which users are guaranteed bandwidth.

With CompuServe and WilTel, a link between two sites can support different CIRs in either transmission direction. For example, a user in Chicago may want a 19.2K bit/sec CIR to handle inquiries to a host in Dallas and a 64K bit/sec CIR in the reverse direction to handle the response. CompuServe and WilTel charge separately for each transmission direction, so users pay only for bandwidth needed.

Sprint Data Group does not allow different CIRs between two sites. For the above example, a user would be required to purchase a 64K bit/sec pipe in each direction.

While such differences in pricing make head-to-head comparisons among the carriers difficult, sample network configurations show Sprint Data Group and CompuServe as the price leaders.

For example, the monthly fee for a four-node network with sites in Chicago, Dallas, Los Angeles and New York, all using 1.024M bit/sec frame relay access ports and a CIR of 256K bit/sec from each site to the other three, would be: CompuServe, $11,960; Sprint Data Group, $12,520 (using its Reserved Rate); and WilTel, $16,400 (see chart, page 56).

Those prices do not include charges for local access lines.

However, Sprint Data Group offers a 768K bit/sec access port option, which the other two firms do not. Use of the lower speed port option would bring Sprint Data Group's price for the same configuration down to $11,420. On the other hand, Sprint Data Group will not let users configure an access port to support a total CIR above the port speed, as will CompuServe and WilTel.

Sprint Data Group's pricing for the configuration using a 768K bit/sec access port and the maximum fee under its usage-sensitive Standard Rate would be $7,070, although users would not be guaranteed 256K bit/sec of bandwidth at any time.

Despite the price differentiators among the various services, they all offer savings for users looking to ditch leased lines. "We're seeing anywhere from 32% to 40% in cost savings with frame relay services relative to leased lines," Malone said.

Steve Sazegari, director and principal analyst at Dataquest, Inc., a consultancy in San Jose, Calif., said users can expect prices to change in the coming months. "You're going to see a major shake-up in these prices toward the middle of next year," he said. "By that time, we'll have several more entries into the market. Don't sign any long-term contracts." ◪

Shopper's guide to frame relay services

Sprint Data Group

Price is based on combination of monthly port fee and Permanent Logical Link charge.

Monthly port fee (per site)	
56K/64K bit/sec	$175
128K	325
256K	600
384K	875
512K	1,125
768K	1,475
1.024M	1,750
1.544M	2,300

Permanent Logical Link charge
Monthly fee based on CIR between 2 locations. One fee covers 2 permanent virtual circuits – 1 in each direction between 2 sites. The CIR must be the same in each direction.

Standard rate (usage-based)

Minimum:	$10 each, plus 50 cents per kiloframe
Maximum:	$195 each

Applies to any port speed.

Reserved rate	
19.2K bit/sec	$230
56K/64K	260

Add $220 for each additional 64K bit/sec. Examples:

128K bit/sec	$480
192K	700
256K	920
384K	1,360
448K	1,580
512K	1,800
768K	2,680
1.024M	3,560
2.048M	Not offered

CompuServe, Inc. Frame-Net

Price based on FBA, which is the sum of permanent virtual circuit CIRs emanating from a site. Fee is assessed in each direction between 2 sites. CIR can be different in each direction.

56K bit/sec port	
16K bit/sec	$180
64K	285
112K	390
256K bit/sec port	
16K bit/sec	$175
64K	320
128K	500
192K	670
256K	820
320K	960
384K	1,090
448K	1,200
512K	1,300
1.024M bit/sec port	
64K bit/sec	$1,200
128K	1,345
384K	1,905
512K	2,180
768K	2,720
1.024M	3,240
2.048M	5,465

Sites more than 1,800 miles from originating location are subject to surcharge. For 56K and 256K bit/sec ports, surcharge is $15 for each 16K bit/sec of FBA. For 1.024M bit/sec port, surcharge is $45 for each 64K bit/sec of FBA.
Price includes DSU/CSU.

WilTel WilPak

Same pricing structure as CompuServe but without distance-sensitive surcharge. Price does not include DSU/CSU.

56K bit/sec port	
56K/65K bit/sec	$500
112K/128K	575
168K/192K	650
224K/256K	725
256K bit/sec port	
16K bit/sec	Not offered
64K	$635
128K	920
192K	1,062
256K	1,176
320K	1,262
384K	1,347
448K	1,404
512K	1,461
1.024M bit/sec port	
64K bit/sec	$1,535
128K	1,820
384K	2,960
512K	3,530
768K	4,100
1.024M	4,556
2.048M	5,696

BT North America, Inc. ExpressLANE

Flat-rate service at 56K/64K bit/sec for monthly flat rate of $2,100 in U.S. and average of $3,800 for connections in countries outside the U.S. Price includes dedicated port access, frame relay software, bridge/router, DSU/CSU and 56K/64K bit/sec access line. Deduct $200 if bridge/router is not required.

CIR = Committed information rate
CSU = Channel service unit
DSU = Data service unit
FBA = Frame Bandwidth Allocation

GRAPHIC BY SUSAN J. CHAMPENY

FCC legalizes Tariff 12 again

continued from page 2

use to determine the legality of other Tariff 12 deal, many of which have complaints pending at the agency.

While last week's ruling clears away many legal questions, the fate of 15 Tariff 12 deals remains unclear. Those deals were filed after Aug. 1, when the FCC ruled in a separate proceeding that it would not allow AT&T to bundle 800 service into the custom packages any longer.

AT&T has asked for special permission to move ahead with 14 of the Tariff 12s, which contain 800 service, contending that the deals were nearly finalized when the agency ruled in August. Sources close to the FCC said the request will likely be denied.

The 15th deal, Option 108, was filed this week. Since that deal does not contain 800 service, it is likely the FCC will allow it to go through. It appears AT&T will be able to file new Tariff 12s that do not include 800 service.

Users responded positively to the FCC's approval of Tariff 12.

A spokeswoman for American Airlines, Inc., which has one of the four Tariff 12 deals included in the reinvestigation, said the firm was pleased with the FCC's decision. "We felt all along that Tariff 12 is legal," she said, adding that the airline would have preferred the FCC had taken less than a year to wrap up the issue.

Pat Whittle, a telecommunications attorney with the Washington, D.C. firm of Gardner, Carton & Douglas, which represents a number of Tariff 12 users, said "The FCC's decision is clearly good for users." Whittle said evidence gathered by the FCC in its first investigation clearly showed that the deals were legal.

"Customer perception [that Tariff 12 deals were different than other services] was so strong and the problems identified by the court of appeals were really technical in nature," Whittle said. "I always thought that it would come out this way."

> It appears AT&T will be able to file new Tariff 12s that do not include 800 service.
>
> ▲▲▲

The central legal question surrounding Tariff 12 is whether it violates provisions of the Communications Act of 1934 that prohibit carriers from offering different rates, terms or conditions to users of similar services.

Critics claim that Tariff 12 is nothing more than an amalgam of existing services packaged at a discount rate for large users. AT&T contends that Tariff 12 is functionally different from other single services.

After hearing from numerous customers, the FCC said it agreed that users perceive Tariff 12 as different from the underlying component services. Therefore, the Tariff 12 packages are different from services available through other tariffs and can be offered under different rates, terms and conditions.

Paradoxically, MCI, a vocal rival of Tariff 12, also weighed in at the FCC as a user, saying it had not found Tariff 12 different from component services. Earlier this year, MCI began purchasing international service through Option 23, a deal initially designed for Chemical Bank.

In addition to the question of whether Tariff 12 deals are different from component services, the court told the FCC to look into whether Tariff 12 packages are similar and whether some Tariff 12 customers were being favored over others.

The FCC initially found that the Tariff 12 packages were similar in its 1989 order. However, the FCC reversed itself last week, saying there are enough differences between deals to justify differences in rates.

Richard Firestone, chief of the FCC's Common Carrier Bureau, said the FCC did a more detailed analysis of the packages this time and was able to determine that they are not alike. ◪

Taking service to the edge

continued from page 1

customer service operations has cost Whirlpool $20 million, but officials say the changes will give the company an edge.

"Our customers told us in surveys beginning in 1988 that they wanted us to be more accessible and our agents to be more useful," said Bill Marohn, executive vice-president of Whirlpool's North American Appliance Group. "So we decided to use network technology to dramatically change the way we do business."

WE CARE . .
Whirlpool
WE CARE BECAUSE YOU MATTER

PHOTOS ©1991 JERRY HEADRICK

Bill Marohn

The service center is linked to the Benton Harbor facility via an Integrated Services Digital Network Primary Rate Interface line. AT&T Definity Generic 2 private branch exchanges at each site are configured as automatic call distributors (ACD).

The company uses AT&T's Megacom 800 service for incoming calls, which are routed to either service center using Megacom 800's area code routing feature.

Whirlpool is also one of the first companies to use the Definity's Look Ahead Interflow feature, which enables calls to be routed to the first available agent at networked call centers.

In addition, Whirlpool uses Aristacom International, Inc. software to support the linkage of the Definitys to an IBM mainframe in Benton Harbor. The PBX passes the calling number to the host, which matches it with a customer profile. The data is then passed to an agent using an IBM Personal System/2 with Presentation Manager as the call arrives from the ACD.

The PS/2s at both sites are linked in work groups of 30 using 16M bit/sec IBM Token-Ring LANs.connected to a 16M bit/sec Token-Ring backbone. Each PS/2 runs IBM's OS/2 Extended Edition, which enables the workstations to interact with one another and with the host.

Each LAN supports an image server based on On-Line Software International, Inc. image retrieval software. These servers each house four CDROM drives with some 150,000 scanned pages of product and service data, which covers 20 years of products. Previously, the data was contained in manuals and on microfiche.

Image retrieval's scope

Whirlpool said that if all the documents in its image retrieval system were lined up end to end, the trail would stretch 26 miles.

The image retrieval system gives agents instant access to detailed information on every U.S.-made Whirlpool product, including KitchenAid and Roper brands, helping them answer customers' marketing, parts and warranty inquiries more quickly and completely.

In addition, Whirlpool teamed with Aion Corp., a supplier of artificial intelligence software, to build an expert system for an online appliance diagnostics application that is designed to help agents identify problems over the phone quickly.

The system provides a series of questions that step the caller and agent through the process of diagnosing appliance problems and determining whether a service call is required or if the situation can be resolved with telephone instructions.

According to Marohn, the expert system may enable the firm to reduce by 10% the number of service calls made to customers. "At roughly $40 a call, that's a lot of money," he said.

Whirlpool has already seen a number of benefits from its use of new technologies. For example, the Look Ahead Interflow feature has helped it attain a 98.5% call answer rate here. Of the 29,000 calls the center has received since Sept. 3, 28,710 have been answered. The rest of the callers got a busy signal or abandoned the call. "We're pleased with those numbers," said Jim Bretz, operations manager for Whirlpool's customer service center.

In addition, the PBX-to-host link lets agents transfer calls and customer profiles to other agents, supervisors or technicians. Before, only the calls could be transferred. The second person handling the call had to reidentify the caller and request the profile anew.

Overall, Whirlpool expects its use of advanced network technologies and LAN-based systems to increase agent productivity by about 10% in 1991, Marohn said. "These systems will enable us to respond to customers faster and more efficiently."

Steve Holmes, Whirlpool's North American Appliance Group president, said much has changed since 1967, when the company introduced the "Cool Line," a toll-free customer assistance line. "We've gone from a Model T to a Lexus," he said.

The new Consumer Assistance Center in Knoxville, Tenn.

IBM, PictureTel to bundle codecs

continued from page 4

nounced their agreement at Comdex/Fall here, where they demonstrated alpha versions of the PS/2 videoconferencing system that they plan to introduce next year.

Big Blue strategy

According to Mims, the agreement with PictureTel is a key component of IBM's plan to support robust multimedia capabilities on the PS/2.

For example, IBM recently announced a new PS/2, called the Ultimedia M57 SLC, that comes bundled with audio and extended graphics adapter cards as well as a CDROM disk drive.

IBM is also developing products to support broadcast-quality video and audio over LANs and wide-area networks at speeds from 1M to 45M bit/sec. The PictureTel relationship will add compressed videoconferencing to the PS/2's growing multimedia capabilities.

Mims said he expects a huge market to emerge for microcomputer-based systems that allow an individual sitting at a desk to videoconference with other individuals or groups.

He also expects microcomputers to become the heart of corporate videoconferencing systems.

"I think there will be a time when all PCs will be enabled for desktop videoconferencing," Mims said.

By early next year, IBM plans to install alpha versions of the PS/2 videoconferencing system in about 10 IBM executives' offices, according to Mims. The executives will use the systems to communicate with each other, as well as with suppliers and customers.

In the first quarter of next year, IBM and PictureTel plan to begin testing about 100 PS/2 videoconferencing systems with 10 customers. The two companies will use the trials to develop PS/2 videoconferencing application software, PictureTel's Mitro said.

Novell, Eastman Kodak lay plans

continued from page 2

will be offered as a software module for use with NetWare Version 3.2, will process client requests for data stored on image subsystems, such as optical disks attached to a NetWare server.

The service will act as a backend image processing engine, enabling software developers to write front-end applications that reside on NetWare clients and request NetWare image services.

Both companies stressed that the announcement is just a technology agreement at this stage; actual products resulting from the relationship are not expected to become available until sometime next year.

Analysts, however, predicted it may take as long as two years before even the first tool kits are available since the task of creating a NetWare imaging service is a formidable one.

According to David Hanson, program manager for Eastman Kodak's Desktop Document Imaging Group in Rochester, N.Y., when products are released, they will be available directly from Novell and through Novell's authorized reseller channels.

Despite the expected long wait, company officials gave a fairly clear picture of the products' capabilities.

Hanson said the imaging engine will likely be available in the form of a NetWare Loadable Module (NLM) for NetWare 3.2.

The NLM itself will handle the overall image processing. For example, it will provide data compression and decompression, mass storage and image management capabilities. It will also have the ability to integrate different types of data, such as text and images, into one document.

In addition, Eastman Kodak and Novell will provide a set of application program interfaces in the form of a tool kit that software developers will be able to use to build image-enabled applications that interact with and take advantage of the NLM capabilities.

This way, software developers need not build an imaging engine into the applications to handle data requests. Instead, the applications will rely on the NLM to process the image requests and handle all the image storage and management functions.

The agreement with Novell is Eastman Kodak's third such venture. It follows similar development initiatives with IBM and Lotus Development Corp.

"This is the third leg in [Eastman Kodak's] strategy to ally with major players in the industry to provide an imaging infrastructure," said Ann Palermo, director of office systems research at International Data Corp., a consultancy based in Framingham, Mass.

The agreements are only the first in a series of technology partnerships, according to Hanson. "Our strategy is to develop ongoing partnerships in the areas of applications, databases, etc.," he said.

HP adds layer to relational DBMS

continued from page 4

Protocol nets.

The client software uses an interactive interface that enables users to write basic OSQL query statements used to access OpenODB. The client software also enables users to build objects and define their relationships within HP OpenODB.

HP said the software may also be run on an X terminal, but its functionality is then limited to providing just the OSQL interface.

On the server side, HP OpenODB contains an object manager, which receives and processes client requests and accesses information from the database portion of the product, called the storage manager.

The storage manager, based on Allbase/SQL, acts as the relational DBMS and performs physical file management and database functions.

Using the external function

HP OpenODB also includes software that enables the object manager to access data and code stored elsewhere on the network. Called external function, it requires listing the resources available and how to access them.

Once listed, however, the object manager can issue requests to external devices and combine that input with data from the storage manager to answer a client request.

Dedo said HP OpenODB will be particularly well suited for users running complex multimedia applications because the intricate code required to write applications manipulating media such as scanned images, for example, can be written once and used by multiple applications.

HP OpenODB, offered initially as a developer's release, is scheduled to be available in December on the HP 9000 Series 300, 400 and HP Apollo Series 700 workstations, as well as HP 9000 Series 800 and HP 3000 Series 900 servers.

It is priced at $100,000, which includes software and documentation with a one- to eight-user license, training, support and five days of on-site consulting.

HP said it will be offering versions supporting as many as 500 users around the middle of next year, but Dedo declined to give price details.

IBM catches up with LAN Server

continued from page 1

versions — the Advanced Package and the Entry Package.

The Advanced Package, which is designed specifically for users running mission-critical LAN applications, features improved performance and fault-tolerant capabilities, according to IBM.

The package offers new disk mirroring and disk duplexing capabilities, which essentially provide an extra copy of all system files if one disk should fail.

LAN Server performance has been enhanced by optimizing its software to take advantage of Intel Corp. 80386SX and higher processors. "Users will see a two- to three-times performance improvement in the file system," said Eileen Beck, LAN Server product manager at IBM.

The Entry Package does not include the performance and fault tolerance enhancements of the Advanced Package. However, it can run on either a 16- or 32-bit workstation operating system.

The Advanced Package will initially run only on IBM's OS/2 Standard Edition 1.3. IBM has stated that it intends to enhance the Advanced Package to run under OS/2 2.0, a 32-bit operating system, though it did not specify when.

Both versions now support the Network Device Interface Specification, which enables users to work with a variety of standard network interface cards, rather than only IBM cards. In addition, both packages can accommodate as many as four adapter cards for links to four LANs.

OS/2 LAN Server now comes as a single integrated product that includes all server functions, requesters and LAN transport facilities.

Previously, customers had to buy IBM's OS/2 Extended Edition to get the OS/2 LAN Server requester, or client shell. Now the requester will be packaged with the LAN operating sytem itself. Users would buy one copy of the requester for each workstation they wish to support.

Both versions will also run on a variety of hardware platforms, such as systems from AST Research, Inc., Compaq Computer Corp. and Tandy Corp.

The two packages are scheduled to be available in April of next year. The OS/2 LAN Server 2.0 Advanced Package will cost $2,295 with a $75-per-client charge. OS/2 LAN Server 2.0 Entry Package costs $795 with a $75 charge per client.

Not good enough

The new version of LAN Server comes just one week after Microsoft Corp.'s release of LAN Manager 2.1, which may be too little, too late, according to analysts.

"It's almost as if they've negotiated a deal where IBM is paced a few months behind Microsoft," said Barry Gilbert, an industry analyst at Computer Intelligence in Acton, Mass.

According to IBM, "OS/2 LAN Server Version 2.0 has the same [application program interfaces] and most of the same functions as Microsoft's LAN Manager 2.0." But LAN Manager 2.0 was released about a year ago.

Microsoft's new LAN Manager 2.1 includes such functionality as support for Apple Computer, Inc. Macintosh and Novell, Inc. NetWare clients and Transmission Control Protocol/Internet Protocol support that IBM does not offer, even with last week's release.

"Two years ago, IBM and Microsoft said they would bring their products closer together [in functionality]," said Jack Karp, vice-president at the META Group, a consulting firm based in Westport, Conn., adding that since the companies have been feuding, the two products are slipping farther apart.

Late, but expected

IBM also released a new version of its desktop operating system — OS/2 Version 2.0.

Version 2.0 is a 32-bit multitasking operating system that will let users run DOS, Microsoft Windows, 16-bit Standard Edition OS/2 and 32-bit OS/2 applications concurrently. OS/2 Version 2.0 also includes an object-oriented Workplace Shell graphical user interface.

Some analysts said OS/2 Version 2.0 may give IBM a leg up on Microsoft, which is working on its Windows NT operating system.

"Both are looking to produce a 32-bit operating system that can be robust, secure and user-friendly all at the same time," Karp said. "Although neither has a product yet, OS/2 2.0 is about one year more mature than NT."

IBM is late in delivering this new version, however. The vendor had promised that OS/2 Version 2.0 would be available sometime this year.

The revised ship date is March 31, 1992, although IBM said it would make prerelease versions available to companies that include the offering in their business plans.

IBM's OS/2 Version 2.0 will cost $195. A right-to-copy license will cost $149 without media and documentation.

Novell sharing IBM vision

LAS VEGAS — Novell, Inc. last week announced a new version of NetWare Requester for OS/2 that is compatible with IBM's new OS/2 Version 2.0.

The software enables users to upgrade client workstations to OS/2 Version 2.0 without sacrificing the ability to access NetWare services.

"I think the closeness of the announcements indicates a planned strategy [by the two companies]," said Charlie Robbins, director of communications research at Aberdeen Group, Inc., a consultancy in Boston. "The two have a vested interest in working together."

OS/2 Version 2.0, coupled with the new NetWare Requester, simplifies access to NetWare services by providing icon-defined desktop utilities and an enhanced installation program, both utilizing IBM's Presentation Manager.

NetWare Requester for OS/2 Version 2.0 provides workstation users with transparent access to file, print, database and communications services.

The new version also provides remote printer support — an OS/2 workstation can now act as a print server in a NetWare environment.

It also enables a NetWare server to support more than 1,000 simultaneous Named Pipes connections or concurrent OS/2 Version 2.0 sessions; the previous version supported only 250 sessions.

It also enables clients running OS/2 Version 2.0 to access OS/2 and NetWare applications simultaneously.

In addition, the new software enables users to share data and resources with DOS, Microsoft Corp. Windows, Apple Computer, Inc. Macintosh and Unix users in a secure network environment, according to Novell.

The new version of the NetWare Requester for OS/2 can be used with NetWare 2.X, 3.X and NetWare for Unix.

Scheduled to be available in limited quantities by year end, NetWare Requester for OS/2 Version 2.0 will cost $200 per corporatewide license.

— *Joanne Cummings*

NASA to upgrade T-1 network

continued from page 4

"We had a lot of bidders that had good capabilities but they were too small to meet the needs of the network," Sissel said.

Boeing Computer Services also plans to use NET's recently announced packet-switch card, which enables the IDNX to support frame relay along with local-area network bridging and routing.

The company signed another contract with Netrix Corp. for as many as 24 #1-ISS integrated circuit/packet switches, which will replace old Sprint Data Group X.25 packet switches, said Philip Hewitt, engineering supervisor for Boeing Computer Services here.

The Netrix switches will support NASA's X.25 Packet Switching System network, which is used for electronic mail, numerous bulletin boards and other applications. The switches will provide a frame relay interface to the IDNX/90s, he said.

NASA's LAN internetwork, dubbed PSCN Internet (PSCNI), is based on Cisco Systems, Inc. routers, which will also be outfitted with frame relay interfaces. That will enable both the X.25 net and PSCNI to feed into common frame relay-based backbone trunks, Hewitt said.

Each network will be configured with a certain guaranteed minimum bandwidth, he said, but will also be able to access the full trunk bandwidth any time it is not being utilized.

Boeing Computer Services may also use NET's LAN/WAN Exchange (LWX), the software and hardware combination that provides an integral bridge/router for the IDNX, he said.

"You can probably realize higher speed because they're in the same box and you can run at backplane speed between the backbone and the router," Hewitt said. He noted that Boeing Computer Services will first have to test the LWX to ensure it has the same features as the Cisco AGS+ routers currently in use.

Boeing Computer Services has not begun testing the frame relay capabilities of the IDNX/90s, although it has installed T-3 multiplexers at three sites — Goddard Space Flight Center, Space Station Freedom Program Office and NASA headquarters — which are in the Washington, D.C. area. The T-3 circuits are provided by Institutional Communications Corp.

"It's a low-cost area to provision DS3s and allows us to gain some knowledge on how DS3s and our new NET boxes work before we implement them in the rest of the network," Sissel said.

At least a dozen IDNX/90s will eventually be deployed in a ring configuration at major NASA centers throughout the country, he said. Besides collecting traffic from the Netrix and Cisco devices, the IDNX/90s will support T-1s from existing Advanced Business Communications Roadrunner switches and Timeplex, Inc. Link/1 multiplexers, which support lower speed lines.

Over time, Sissel said he expects to upgrade the IDNX/90s to Synchronous Optical Network-based switches from NET's Adaptive Corp. subsidiary.

Wide-area T-3 circuits for the network will be provisioned according to terms of the U.S. government's Federal Telecommunications System 2000 contract.

Users get peek at new PBXs

continued from page 6

to support remotes as far as 100 miles from the main PBX.

AT&T would not divulge pricing for the G3s or the cost of the upgrades. Koenig said the upgrades will be available in the first half of 1992 and the G3s will be available shortly thereafter.

Doreen Austin, a senior analyst at Technology Investment Strategies Corp., a Framingham, Mass., market research and consulting firm, said, "The upgrades are geared toward users who need greater and faster call processing for call center applications such as inbound and outbound telemarketing and networking."

Users briefed by AT&T in advance of last week's meeting here expressed interest in the Definity G3s.

"They are definitely heading in the right direction," said Edward Fontenot, vice-president of technology for Rockefeller Group Telecommunications Service, Inc., which provides telecommunications services to 10,000 end users in Rockfeller Center, as well as large New York firms and some city agencies. He is also a former president of the System 85 Users Group.

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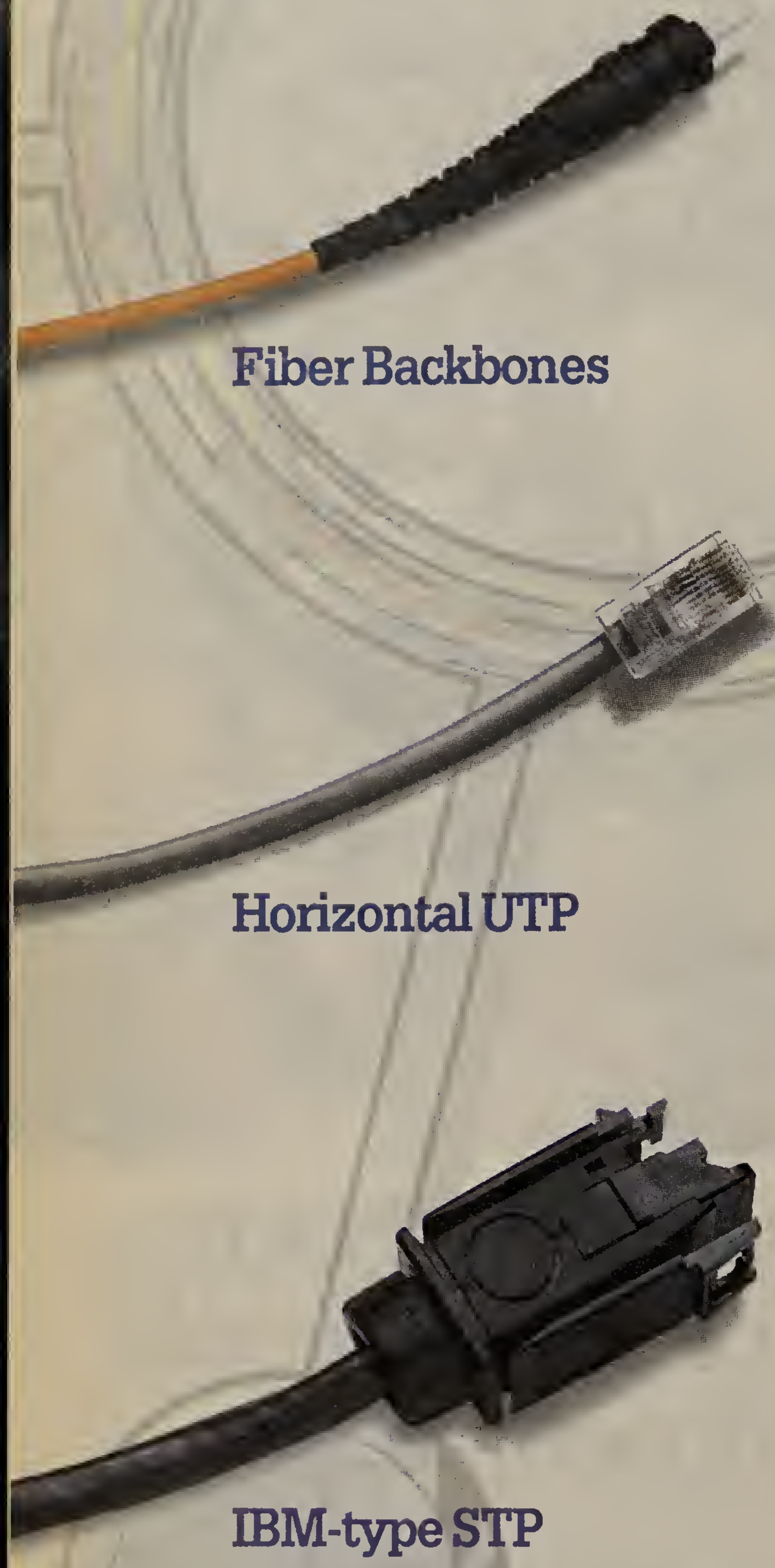

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